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DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with every copy of this week's issue.

Tube Railway Collisions

IN commenting on the collision of March 10 which occurred in the tube between Waterloo and Charing Cross, certain papers asserted that there had been only two previous collisions on London tube railways, one at Caledonian Road on September 4, 1912; and the other at Hammersmith on June 10, 1932. There have, however, been other collisions, as, for example, that on the City & South London on September 26, 1900, when a train passed the Bank up outer home signal at "danger." At the inquiry other instances of two trains in a block section were said to have been known, of which the company admitted one—there was presumably no collision—between Borough and Elephant & Castle, the responsibility for which appears never to have been established. Another collision took place at Shepherds Bush, Central London Railway, on September 30, 1913, when, by an almost incredible series of blunders, an experienced man—who had been a signalman from the opening of the line 13 years before—got both outer and inner home signals green behind a train. In these two accidents signalling was mechanical, controlled by Spagnoletti's lock-and-block, of the type introduced on the City & South London at its opening in 1890, with—on the Central London—train stops. Automatic signalling was being installed on the latter line, however, and the last portion of the old equipment from Holland Park to Wood Lane, was due to be superseded in a few weeks. There was also a collision between Maida Vale and Warwick Avenue on February 25, 1918, and one between Strand and Charing Cross on January 19, 1925. With the present highly developed signalling arrangements, the presence of a second train in a section should occur only under special working after a signal failure as in the present case, when very slow speed is being run, and any really violent collision is thus out of the question.

* * * *

The Late Mr. Alfred Whitaker

In our Personal columns this week we record the death on March 5 of Mr. Alfred Whitaker, who, during a railway career of nearly 51 years, was the originator of numerous patents directed to the improvement of locomotive handling and train working. From 1889 until 1911 he was Resident Locomotive, Carriage, and Wagon Superintendent of the Somerset & Dorset Joint Railway, and during that period was responsible for rebuilding the company's workshops at Highbridge, including the installation of new machinery and plant. Under Mr. Whitaker, the locomotive, coaching, and goods vehicles of the railway were brought up to date by new construction or rebuilding. Mr. Whitaker received his training on the Midland Railway as a pupil of Mr. Matthew Kirtley, and it was on that system that one of his earliest inventions—adjustable extension rails to allow turntables to handle longer locomotives than those for which they were designed—first found extensive application. He also invented a tender water indicator, and an inclined traverser for moving engines in shops having only one overhead crane. But his name is most prominently associated with his tablet and token exchange apparatus for single lines, now used in various parts of the world.

* * * *

The Week's Traffics

An increase of £33,000 is shown by the combined receipts of the four main-line companies for the past week. Passenger train and merchandise traffics advanced £17,000 and £24,000 respectively, but coal traffic declined £8,000. The combined increase for the year to date is now £1,000,000 on aggregate takings of £29,039,000 or 3·57 per cent. Total takings for the past week were L.M.S.R. £1,193,000, L.N.E.R. £888,000, G.W.R. £498,000, and Southern Railway £356,000.

	10th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 1,000	+ 9,000	− 6,000	+ 4,000	+ 358,000	+ 3·12
L.N.E.R. ..	+ 2,000	+ 6,000	− 5,000	+ 3,000	+ 358,000	+ 4·23
G.W.R. ..	+ 3,000	+ 7,000	+ 2,000	+ 12,000	+ 184,000	+ 3·93
S.R.	+ 11,000	+ 2,000	+ 1,000	+ 14,000	+ 100,000	+ 2·91

Great Northern (I.) traffics for the past week, totalling £16,350, show a decrease of £1,200; Great Southern, totalling £67,230, an increase of £195; and Belfast and County Down, totalling £2,138, an increase of £5. Mersey Railway receipts total £4,105, an increase of £148; and Liverpool Overhead £1,331, an increase of £210.

* * * *

London Transport Wages

The ratification of the agreement concluded between the London Passenger Transport Board and the three railway trade unions (reported on page 501 of last week's issue) marks another noteworthy stage in the relations between the parties to the agreement. Many months have passed since the trade unions submitted their programme of improvements in rates of pay and conditions of wages of the staff employed on the board's railways, and the scope and

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extent of the programme were such that it appeared unlikely that a mutually acceptable settlement could possibly emerge. It is important to remember that the Act of Parliament which established the L.P.T.B. also made provision for the setting up of a scheme of machinery of negotiation for discussion of staff and labour matters. The scheme culminated in an appeal body very similar in type and constitution to the National Wages Board for the main-line railways, which was set up under the Railways Act, 1921, and which ceased to function in 1934, after notice given by the companies under Section 62 of the Act, of their intention not to refer issues to the board. Although the L.P.T.B. has been in existence since 1933, the Wages Board has, up to the present, not been called upon to give any decision, and the agreement just made was reached by the negotiating committee, consisting of six representatives of each side. That an agreement was achieved, is in itself a tribute to the skill with which the negotiations were conducted. Perhaps the most important feature of the new agreement is the recognition that employees in the Operating Department should receive a minimum wage of 52s. a week. The new rate is, of course, considerably higher than the rates applicable to staff of the main-line companies, but it must not be forgotten that there are many fundamental differences between the main lines and London Transport.

* * * *

The Nizam's State Railway in 1936-37

The total capital invested by the Nizam's Government in its railway system to the end of March, 1937, was Rs. 14,64,65,627. The gross earnings for the year ended on that date were Rs. 2,28,80,377 compared with Rs. 2,11,91,697 in the previous year, and the net earnings Rs. 1,14,75,239 compared with Rs. 90,83,503 for 1935-36, giving a return of 7·6 per cent. on the capital. These figures were anticipated in the preliminary review contained in our editorial of May 28 last. Notwithstanding the considerable increase in earnings, working expenses showed an appreciable decrease of 6 per cent. from Rs. 1,21,08,194 in the previous year to Rs. 1,14,05,138. The operating ratio decreased to the extremely low figure of 42·8 per cent., a most satisfactory figure, and one that is better than that of any other Class I railway in India. It is significant also that the earnings from goods traffic were the highest on record, the figure reaching Rs. 153.65 lakhs, or Rs. 63,000 higher than the previous highest figure in 1930-31. Probably the most important progress during 1936-37 was the further development of the road motor services, an activity in which the Nizam's Railway undoubtedly leads Indian railways. On March 31, 1937, it operated 3,977 route-miles of road services over three-quarters of the roads in Hyderabad, and owned a fleet of 318 motor vehicles. The road services showed net earnings of Rs. 3,81,413 equivalent to 8·18 per cent. return on capital.

* * * *

A Good Press

As a rule the long experience of responsible railway executives and the fairly constant incidence of movements of mines, crops, and so on, facilitate the estimation of future demands to a fair degree of accuracy. Occasionally, however, the unexpected happens. A bumper crop, or a new discovery of mines, or oil, or an unusual migration or pilgrimage, will upset all calculations, with the result that there is congestion and delay, and the unfortunate railway administration is blamed for the consequences of what no one could foresee. At such moments, when the public is clamouring and the railway executives are harassed with anxiety, it is a boon to be able to count upon "a good press." If the newspapers are able and willing to keep their readers informed of the reasons for the congestion and delay, and of the measures taken to remedy the difficulties, travellers and traders will make allowances. This was the case with the South African Railways during the period last year when the unparalleled and unforeseen activity on the Rand, and the consequent stimulus to industry generally, taxed the resources of the railways to the utmost. Fortunately, as the General Manager says in his annual report, the sympathetic attitude of the press in making prominent reference to the difficulties with which the railways were faced, and the steps that were being taken to overcome them, rendered a real service to the administration and to the country as a whole.

* * * *

An Unusual Accident

A most unusual accident occurred on October 4, 1937, at Liverpool Central station, when the locomotive of an incoming express, negotiating a sharp curve at the entrance to No. 1 platform, struck the coping, doing a great deal of damage and derailing the train. Fortunately, only two of the station staff were slightly injured by flying stones, while the driver and a passenger suffered from shock. Colonel A. C. Trench inquired into the case, and a summary of his report appears on page 553. Several witnesses testified that the train ran into the terminus much faster than the prescribed 10 m.p.h.—one put the speed at 35 m.p.h. Colonel Trench concludes that speed was excessive and thinks the driver may have lost his location and found himself near the station unexpectedly. The distance run after striking the coping—134 yd.—and damage done confirm this. The permanent way was generally suitable only for the low speed allowed but has been strengthened. It is considered that the platform coping might be set back a little but that no signalling alterations are called for. The electric lights on the tunnel walls, at 12-yd. intervals for 100 yd., are also thought adequate. The report places some responsibility on the guard, who observed that speed was on the high side but did not go to take effective action until too late.

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Adaptability

In the best-regulated families accidents happen; and with the highest standards possible of locomotive maintenance there will be the occasional casualties that make necessary the removal of a locomotive from a train. In such circumstances runs have been made from time to time which might not have been deemed possible with the substituted locomotive had the emergency not arisen. A recent example on the L.N.E.R. metals was when the engine due to work the West Riding Limited from King's Cross developed a slight defect, and the only locomotive immediately available was one of the 2-6-2 "Green Arrow" type, which was about to haul the heavy and moderately fast Aberdonian express to Grantham. The "Green Arrows" were designed for mixed traffic work, and with driving wheels only 6 ft. 2 in. in diameter speeds much in excess of 70 m.p.h. are not to be expected. Nevertheless, with due allowance for a number of permanent way and signal checks—for the train started late owing to the change of engines, and was running out of course—the 2-6-2 engine is reckoned to have lost no more than 4 min. on this high-speed booking. Indeed, over the 138¼ miles from Hatfield to Doncaster the time of 123 min., less 12 min. delays, was practically as booked, and at a net average of 74·7 m.p.h. throughout this astonishing performance showed the capacity of the engine for "mixed traffic" on a scale considerably wider than the designer ever probably contemplated.

Pioneer G.C.R. Turbine Steamers

In the recent announcement of the sale of the Greek steamer *Velos* to Italian scrappers, probably few recognised the passing of a famous railway-owned pioneer, but she was originally the G.C.R. vessel *Marylebone;* she and her sister, the *Immingham*, were the first turbine packets in the Great Central fleet and were built in 1906. The *Marylebone*, which came from the yard of Cammell Laird & Co., had a gross tonnage of 1,972. Triple screws with 6,500 s.h.p. gave a contract speed of 17 knots. The ship did all that her builders promised, and on the Humber-Continental service not only carried large quantities of special cargo and a number of first class passengers, but was given accommodation for over 300 emigrants in the 'tween decks, making their way across England to the transatlantic steamers at Liverpool. At the beginning of 1911 it was decided that she should be re-engined as a 13½-knot reciprocating-engined vessel, and the four original boilers reduced to two, as that form of propulsive machinery was deemed more satisfactory for a ship of moderate speed and large carrying capacity. During the war the *Marylebone* was kept very busy on a variety of duties. She came under the L.N.E.R. at grouping in 1923, and remained on the Continental service until 1931, when she was sold to the Tramp Shipping Development Company for £3,000 and sent to the Eastern Mediterranean. The vessel changed hands several times, and was first renamed *Velos* under the British flag, then *Arafat* under the French, and finally *Velos* again under the Greek.

* * * *

The Importance of Exhaust

In the discussion at the Paris International Railway Congress on recent improvements in steam locomotives, M. Chapelon expressed the opinion that of all the improvements made in locomotive design in recent years those relating to the exhaust headed the list in order of importance. Numerous old locomotives have, as he pointed out, been very considerably improved merely by perfecting the exhaust arrangements even when the steam circuits remain defective. One fact common to all the improvements made to the exhaust in recent years is the enlargement of the chimney, and M. Chapelon paid a tribute to the German State Railway as the first to adopt this improvement on the Pacific type locomotives built in 1921, the chimneys of which had a diameter of 600 mm. (24 in.). In the course of the same discussion Signor Mascini of the Italian State Railways referred to the completely satisfactory service during the past 15 or 20 years of nearly 400 locomotives on his system fitted with poppet valves. One particular advantage of these valves was the ability to use high superheat temperature without lubrication difficulties.

* * * *

The Use of Private Wagons

Without entering into the question of the advantages and disadvantages of the use of privately-owned wagons on our railways, it is correct to say that while present conditions exist an important contribution to railway transport is made by companies owning fleets of wagons available for hire, and perhaps more particularly in the supply of vehicles of a specialised nature. The principal use of private wagons is, of course, for the transport of coal and the use of the 20-ton all-steel wagon, especially for the South Wales pit-to-port traffic, is becoming more popular in view of the special rebates allowed by the Great Western Railway Company on carriage, tipping, and weighing charges, on such trucks. The 12-ton wagon is still in demand for localities where appliances have not yet been provided to deal with the larger type, or where output is in limited quantities, but in other places where colliery companies cannot at once change their equipment, the hiring company is ready to fill the want. The Cambrian Wagon Works Limited, which has acquired the extensive wagon building and repairing works at Maindy, Cardiff, owns approximately 2,000 wagons of all types available for hire for long or short periods. This fleet of wagons includes not only trucks suitable for coal transport but others such as 20-ton iron ore hopper wagons and special types of rolling stock for the Admiralty and for steel works. According to the rules laid down by the Ministry of Transport, wagons for use on main lines must be thoroughly overhauled at least once in every seven years. An extension has been granted, of six months, but the work must be completed by June, 1938. The Cambrian Company undertakes this very essential work of repairs, as well as the manufacture of ironwork of every description for those owners who undertake their own repairs.

* * * *

Experimental Long Rails in Australia

The line of the Victorian Government Railways between Melbourne and Geelong is used for some of the fastest trains in that State, and it has recently been completely overhauled, including relaying throughout between Newport junction and Geelong with new 90 lb. rails in 220-ft. lengths, with the exception of two experimental sections between Newport junction and Laverton in which the rails have been welded into lengths of 4,748 ft. and 4,321 ft., so far as we know the longest in use in the world except on the Delaware & Hudson Railroad of the U.S.A. which has adopted the practice of abolishing rail joints altogether except where they are necessitated by points and crossings or the ends of track circuits. In the reconditioning of the Geelong line nearly 100,000 hardwood sleepers (spaced at 2 ft. 2 in. centres) and about 80,000 cu. yd. of broken stone ballast were used. The formation width of the line, which is single, is 20 ft., and a minimum of 10 in. of ballast is placed under the sleepers. A trial trip of the new streamlined train, Spirit of Progress, which is now running on the Victorian section of the Melbourne—Sydney route, was recently carried out on the Geelong line and gave rise to appreciative comments on the part of the passengers as to the excellence of the running both in regard to smoothness and silence.

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"Pendulum" Type Railway Coaches in the U.S.A.

There is now being tested on the Atchison, Topeka & Santa Fe Railway, a new type of passenger coach built in the form of an articulated two-car unit, and described as the "pendulum" type. The idea is that of providing minimum weight for purposes of economy, low centre of gravity, large design factors of safety, and smooth riding on existing tracks. The principal interest in the new design centres about the suspension system, or method of mounting the coaches on the bogie trucks, which departs completely from standard practice. The vehicle body is virtually suspended from the bogie, floating on soft vertical coil springs in a plane above the centre of gravity of the body. These springs permit, through horizontal deflection, all necessary bogie truck movement relative to the body, which motion is positioned and controlled by a pair of horizontal links elastically restrained by rubber, acting between the body and the bogie frame at a height well above the body centre of gravity. Tests of the new train unit are now in progress, and indicate a substantial improvement in passenger comfort. Standing and walking about are said to be facilitated, whilst writing at a table is distinctly easier, and the results much more legible than is possible in a standard type of vehicle.

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Austria and the German Reich

AS a technical journal concerned with railway progress throughout the world THE RAILWAY GAZETTE has no comment to make upon the important political changes which took place in Central Europe over the past week-end. To those familiar with the somewhat tragic commercial prospect which was left to the Austrian Republic on its formation after the war, it has long been obvious that sooner or later some change was inevitable in that historic territory which emerged from the wreckage with little but its great natural beauty to provide its means of livelihood. Vienna, with a population of about 1,900,000 out of the country's total of 6,700,000 was obviously unduly large as a capital city for a territory of but 32,175 square miles. The area suffered from a paucity of mineral wealth, in particular the absence of coal. In the past an attempted solution of these problems in the form of an *Anschluss** with the German Reich has been opposed by certain of the former allied powers. Historically, culturally, and commercially such a desire was not unnatural, for Austria was, together with all the other German States, a member of the Holy Roman Empire for many centuries until the final dissolution of that Empire in 1806 under the onslaught of Napoleon's military adventures. The Empire had been formed as early as the year 800 when Charlemagne was crowned Emperor of the West, after he had established virtual order among the Germanic peoples whose westward drives had disrupted the old Roman Empire. Just over a century later, when the Carlovingian dynasty had been succeeded by a Saxon dynasty, Henry the Fowler (Duke of Saxony) and his son Otto the Great carried out a work of unification. In succeeding centuries the Imperial crown was worn by members of the Royal Houses of Hohenstaufen, Hapsburg, Luxemburg, and Bavaria, but from 1437 onwards the Austrian House supplied the Emperors of Germany until Francis II renounced the title on August 11, 1804, and assumed that of Emperor of Austria. The formal abdication of the Emperor, and the dissolution of the Germanic Confederation took place on August 6, 1806. The failure of the male line of the Hapsburgs resulted in the succession of the famous Maria Theresa in 1740, whose right to the Empire (supported by England, but opposed by Prussia, France, Bavaria, and Saxony) resulted in a general war. Peace followed the election of her husband—Francis, Duke of Lorraine—as Emperor in 1745.

In June, 1815, Austria (though not Hungary) became a member of the German Confederation which constituted the "Germany" of the days before the German Imperial Crown was established. Indeed, reference to our early files shows that news regarding the railways in Austria, in common with those of Prussia, Baden, Bavaria, and indeed all the German States, was given under the generic heading "Germany." After the war of 1866 between Prussia and Austria, there was a brief period when Prussia headed a North German Confederation which excluded Bavaria, Baden, Württemberg, and Austria, but on the establishment of the Deutsches Reich in 1871, with the King of Prussia wearing the Imperial Crown, all the Germanic States excepting Austria were included in the new Germany. Austria, of course, continued as a unit of the Austro-Hungarian Empire, which included various non-German possessions of the House of Hapsburg. It was the latter which were segregated from Austria proper in 1919. It remains only to place on record the latest developments, namely, the incorporation of Austria as an integral State of the German Reich, and the proposal to transfer the capital from Berlin to Munich. From the railway viewpoint this will probably result in the incorporation of the Austrian Federal Railways into the Reichsbahn, as Germany has long since merged into the central power the former state-owned railway systems of the constituent states. The first steps towards this complete absorption appear already to have been taken, as a press message from Berlin announces that the head of the Reichsbahndirektion at Oppeln has been sent to Vienna to act as representative of the Reichs Minister of Transport in the management of the Austrian Federal Railways.

* This word, which means literally a junction or union, is commonly applied politically to a customs union or a federation of two States for certain purposes.

* * * *

Spring Seasonal Traffics

THE reference by Lord Horne at the annual meeting of the Great Western Railway to the record tonnage of broccoli traffic conveyed by rail from Devon and Cornwall last year, is one indication of the manner in which the railway companies have assisted the development of what are termed "seasonal" traffics. Less than fifty years ago the prosperity of West Cornwall depended largely upon the production of tin and copper, but, with the cessation of this industry, broccoli growing has been very extensively developed. Expeditious transit and reasonable rates to the large consuming areas have enabled markets to be extended steadily, and during the spring of last year a record was achieved by the dispatch of over 36,000 tons by rail. This tonnage necessitated the use of nearly 20,000 trucks and the operation of 455 special trains. The broccoli is loaded in vacuum brake fitted goods wagons of the open type, but there is an increasing demand for cattle trucks to be used, as the ample ventilation of the vehicles and the cover afforded by the roof makes them very satisfactory for the purpose. Express goods trains leave West Cornwall about noon each day, giving an arrival in the late evening at London, Birmingham, Manchester, and South Wales, with delivery to the markets in the very early hours of the morning. Broccoli is also grown in Kent, from which area it is conveyed by fast trains to London, while a substantial tonnage of French broccoli is imported at Weymouth and conveyed by express goods train services to various important consuming centres.

The railway companies have also been largely concerned with the development of the spring flower growing industry in the Scilly Islands and the Penzance district. Last year over 2½ million boxes of cut flowers weighing about 7,000 tons were conveyed by special boats and express trains, which were scheduled to enable the flowers to be on sale in the principal markets within 24 hr. of packing. Considerable initiative and activity are also shown by the companies in catering for the conveyance of forced rhubarb, which is cultivated principally in a comparatively small area of the West Riding of Yorkshire, where the climatic conditions and soils seem to be particularly suitable. The season usually begins in late December and extends to the following May, and the extent to which satisfactory prices are obtained for the luscious pink "sticks" is dependent to a considerable degree upon freshness and the retention of "bloom" at the time of arrival at market. Packing is, therefore, delayed until the latest possible moment, and as the traffic is particularly susceptible to damage from pressure, special attention has to be paid to packing, handling, and stowing. Railway motor vehicles call at the packing sheds in the evening and connect with express goods trains which reach the principal towns during the early hours of the morning. During a normal season over 250,000 boxes are collected, conveyed, and delivered by the companies, one company

alone carrying over 3,000 tons of this delectable commodity.

Shrubs and plants are handed to the companies for conveyance in very large numbers during the early months of the year, and special care is taken to ensure expeditious transit and protection from damage *en route*. A growing business is being done in connection with the conveyance of eggs for hatching, which, although packed in stout cardboard boxes, require very careful handling, and the packages of day-old chicks which can now frequently be seen at the principal termini brings the added necessity for loading them where they are not likely to experience draughts or suffer discomfort from undue heat. While the arrangements for dealing expeditiously with these and similar seasonal traffics have become more or less standardised as the result of experience, careful planning is necessary to avoid interference with more regular business.

* * * *

The Wirral Railway: An Historical Note

THE electrification of the Wirral Section of the London Midland & Scottish Railway, which was officially inaugurated on March 14, brings to fruition dreams of nearly forty years. At a meeting of the directors of the Wirral Railway Company in February, 1900, the Chairman, Mr. T. H. Jackson, referred to their neighbour, the Mersey Railway, which had obtained powers and was beginning to electrify its line. He stated that a favourable report on the possibilities of, and benefits to be derived from, a conversion to electric traction had been received from Mr. Cotterell, Engineer of the Liverpool Overhead Railway, who had been called in as consultant. The Wirral line was well adapted for such conversion, and very far reaching results were expected. Shortage of money appears to have prevented any immediate action, and other than allotting a sum of approximately a quarter of a million pounds on estimated capital expenditure nothing was done. From April, 1903, until the present day passengers from the Wirral to Liverpool have therefore had to change at Birkenhead Park. The Wirral Railway enjoyed a long and prosperous life as a steam-operated concern, and its inception dates from July 28, 1863, when the Hoylake Railway Company was incorporated, with powers to make railways from Birkenhead, and Poulton-cum-Seacombe to Hoylake. In 1865-6 further authorisation was obtained to extend to New Brighton and to Parkgate, but full powers were not then exercised. In fact, only the 5½ miles between Dock Cottages (Birkenhead) and Hoylake were completed, and these were opened on July 2, 1866. In 1869 the company was forced to close down, and on July 8, 1870, the line was seized by bailiffs at the instance of a local landowner.

By the Act of July 18, 1872, the Hoylake & Birkenhead Rail and Tramway Company was incorporated and acquired the railway of the old Hoylake company, which it reopened on August 1, 1872, and in 1873 powers were obtained to extend to West Kirby and to make a connection from the terminus at Birkenhead Docks station with the railways of the Mersey Docks & Harbour Board. The old platform at Docks still exists, as do the remains of the old wooden station buildings. For many years the latter have served as a stores for the present Birkenhead North Motive Power Depot. The West Kirby extension was opened on April 1, 1878, and in 1881 powers were obtained to extend to Seacombe, and to change the name of the company to the Seacombe, Hoylake and Deeside Railway. In 1882 the New Brighton extension was begun, and in the following year the Wirral Railway Company was formed. By the Act of 1883 and by the Certificate of the Board of Trade, and under powers conferred by the Railways Construction Facilities Act of 1864, also by further Acts of 1884-5 and 1888, the Wirral Railway was authorised to construct railways in the "Hundred of Wirral in the County of Chester" communicating with the Mersey Railway, the Seacombe, Hoylake & Deeside Railway, and the Chester and Connah's Quay extension of the Manchester, Sheffield and Lincolnshire Railway (now part of the L.N.E.R.). Communication with the Mersey Railway was effected on January 2, 1888, when the Mersey Railway extension from Hamilton Square to Birkenhead Park was opened; on the same day the New Brighton line was opened as far as Wallasey; New Brighton was reached on March 30 in that year.

A portion of the extension towards Chester had been completed, and by the Act of 1889 this was transferred to the joint ownership of the Great Central, and The Wrexham, Mold & Connah's Quay Railways. The G.C.R. became the sole owner of the railways so transferred as from January 1, 1905, when it absorbed the Wrexham, Mold & Connah's Quay line. On June 11, 1891, a new Wirral Railway Company was incorporated to amalgamate the undertakings of the S.H. & D., and the old Wirral. June 1, 1895, saw the opening of the Seacombe extension, and an Act passed in that year provided for an extension to be constructed from the existing station to a point alongside the landing stage of the Wallasey Ferries. This, however, never materialised. On the same date the line from Birkenhead to Hoylake was doubled, and in the following year doubling of the line from Hoylake to West Kirby was completed, and a new station at West Kirby opened. The year 1906 saw the Slopes branch opened, thereby affording connection with the dock lines on the north side of the docks between Birkenhead and Seacombe. A further connection completed in the same year was between a point near the Docks station, and communicated with the Great Central Railway, crossing the Wirral main line at what is now Birkenhead North No. 2 signal box. This line has been a regular path for shipping coal, iron ore, &c., between the docks and the G.C.R. yard at Bidston. The station at Leasowe Road on the New Brighton line was opened on March 1, 1907, and from the first did good business, particularly in season tickets. By the Railways Act of 1921 the Wirral Railway was absorbed by the Western Division of the L.M.S.R.

The growth of the Wirral Peninsula as a residential area has been rapid, and train services have been augmented from time to time as circumstances warranted. In 1889 an hourly service to West Kirby and to New Brighton was maintained, and the timetables of that year bore a foot-note to the effect that the times shown were those at which "trains may be expected to arrive at and depart from the several stations," also that passengers were advised to be present five minutes before departure time to ensure being booked. The weekly passenger mileage was approximately 3,500. Ten years later this figure had risen to about 5,000 miles and in 1919 to 8,700 miles, while the freight mileage had increased from 200 to 500 miles a week in 1899 and 1900 respectively. At the present day the passenger and freight mileages are approximately 12,000 and 2,000 miles. In 1905 the West Kirby services were augmented by three good morning and evening trains especially for the convenience of business men, and Manchester was thus brought within 1½ hr. of West Kirby. In the same year the New Brighton services were revised and additional trains put on. It was hoped to put on a service between New Brighton, and Seacombe, and for some years from 1906 such a service did operate and was locally known as the "dodger" service. It did not pay and was ultimately withdrawn.

The popularity of New Brighton and Wallasey with day-trippers, most of whom came from Liverpool, was responsible for large alterations in the 1934 timetables,

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when during the summer months a ten-minute service operated on the New Brighton line on Saturdays and Sundays if the weather were favourable, although the standard twenty-minute service was worked should the weather prove inclement. Such augmentation has been well worth while and has also been applied to bank holidays, when as many as 47,000 people have been conveyed on the Wirral Section. New Brighton was brought into direct communication with London on October 1, 1923, by the inauguration of a through carriage service *via* West Kirby, Hooton, Chester, and Crewe. The up coach went forward from Crewe attached to what is now the 11.15 a.m. ex-Liverpool, Lime Street, and the down carriage left Euston on the 5.20 p.m. express for Crewe.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The G.W.R. London-Birmingham Service

Chester, March 5

TO THE EDITOR OF THE RAILWAY GAZETTE

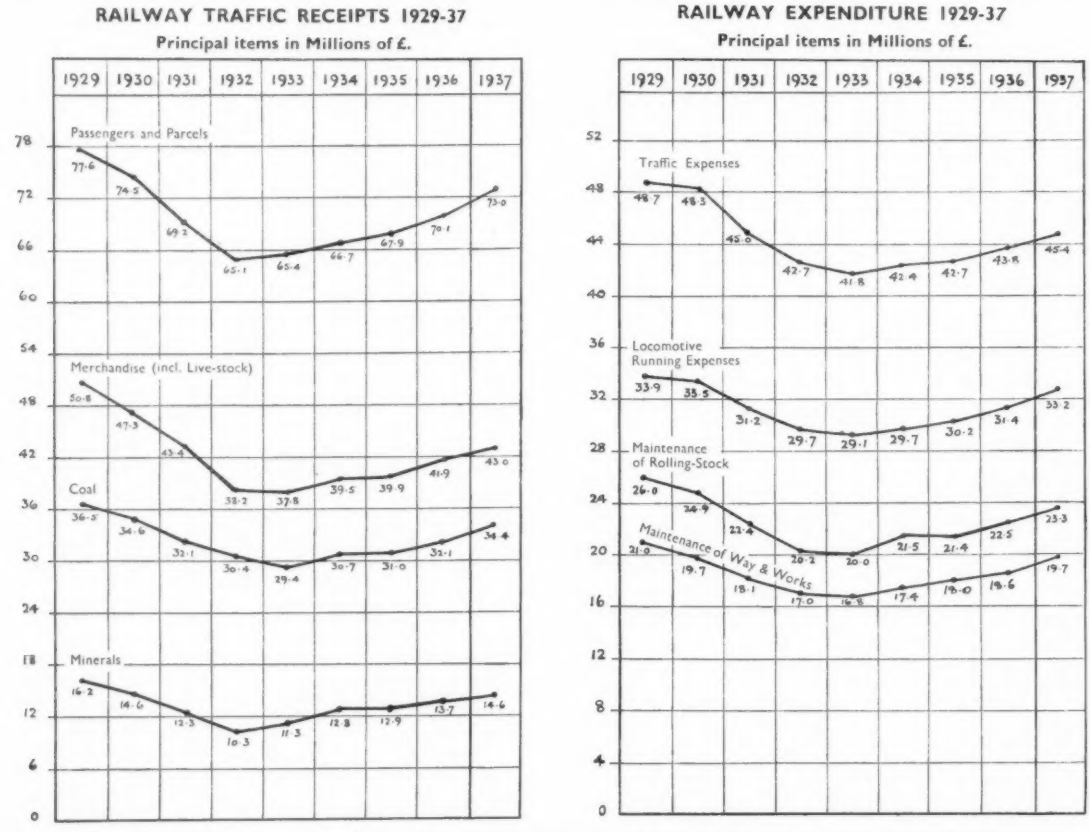
SIR,—There has been much correspondence in your columns lately concerning Great Western Birmingham services, but surely there are timings on other routes of that company which are in even more urgent need of improvement?

The traveller from the North of England is doomed to traverse the 120 miles from Shrewsbury to Bristol at an average more often under 40 m.p.h. than over, due in part to the inordinate duration of station stops. Up South Wales expresses are booked over the favourable 77 miles from Swindon to London at 57 m.p.h., compared with the 72 m.p.h. average of the "Bristolian"—a difference for which the heavier loads of the former trains cannot entirely account on so level a route. Or, on the West of England main line the 4.10 p.m. from Plymouth to London requires from Taunton start 15 min. longer to London than the "Cornish Riviera" from passing, despite a load for 9 months of the year well under 300 tons. On the writer's only trip on this train speed remained *below* 60 m.p.h. the whole way from Reading to Paddington in order to avoid an excessively early arrival.

More examples could be cited, but it is clearly the inferior demands made on standard locomotive types over certain routes, and the wide margin separating the *best* inter-station times from the *average*, that is most generally and most justifiably criticised in the present G.W.R. timetables.

Yours faithfully,
"GOLIATH"

[In timing express passenger trains cognisance has to be taken of various cogent factors, such as track occupation, tonnage, gradients, permanent speed restrictions, and station work (*i.e.*, attaching and detaching through vehicles and engine changing) and it is these factors separately or in combination which account for variations in train schedules.—ED. *R.G.*]



Graphs showing the trend of traffic receipts and expenditure of the British main-line railways for the years 1929 to 1937. Reproduced from the brochure "Facts about British Railways" reviewed on the opposite page

PUBLICATIONS RECEIVED

Facts about British Railways, 1938.—The 1938 edition of this well-known handbook, issued free by the British Railways' Press Office, is now available. Within the compass of 32 small pages it gives a wealth of information in concise and lucid form illustrating the various directions in which the railways have been active during the past year, and the ways in which they cater for the needs of the trader and the traveller. Included also are several pages of general and financial statistics. The trend of traffic receipts and expenditure for the years 1929-37, for instance, may be observed by means of the graphs reproduced at the foot of the facing page. As is pointed out by Sir Ralph L. Wedgwood in the foreword, the facts and figures presented in this publication relating to the British railway system, reflect the welcome general improvement in trade which has taken place during 1937. The transport service offered by the railways is so comprehensive that the part which the companies are called upon to play in the industrial and social life of the country becomes more important year by year. The railways look back on the year 1937 with satisfaction, Sir Ralph concludes, and they look forward to 1938 with confidence. Copies of this booklet may be obtained from the British Railways Press Office, St. Ermin's (South Entrance), Caxton Street, Westminster, London, S.W.1.

Payne's Carriage of Goods by Sea. By John Samuel, M.A. London: Butterworth & Co. (Publishers) Ltd., Bell Yard, Temple Bar, 5½ in. × 8¾ in. 157 pp. Price 8s. 6d. net.—This is the fourth edition of the well-known and authoritative work on maritime goods transport. The previous or third edition was rendered necessary by the promulgation of the Carriage of Goods by Sea Act, 1924, but as that edition necessarily appeared immediately after the passage into law of the Act, comment upon it was limited. Now, for the first time, the various provisions of the Act are described, in their respective appropriate places, and dealt with in the light of the discussions and cases to which it has given rise since its passage into law. The text of the Act itself and its schedule, are given in full in an appendix, and other appendices contain, as in previous editions, the text of earlier Acts. The York-Antwerp Rules, 1924—a modification and extension of the earlier set—are also given. Although necessarily the limits of such a text book as this demand a rigorous condensation, it is to be regretted that the student is not given a more detailed explanation of the history of these rules and the part they play in maritime insurance. The importance of the 1924 Act is evidenced by the references to it that have been interpolated, chapter IV having been entirely rewritten. This and the copious references to pertinent cases would alone have justified the publication of the new edition. In other respects the work has followed the lines of the original issue, taking the student through the almost elementary features of the subject in the earlier chapters, from "Commercial Practice," through "Bills of Lading" and "Charter Parties," on to the legal liability of shipper, carrier, and agent, and the more abstruse depths of maritime insurance, in which connection there is a chapter devoted specially to the complexities of General and Particular Average. As in previous editions the appendices include standard forms of bills of lading and charter parties, and a table of "cases," in addition to the index.

City of Birmingham Handbook, 1938.—This year's edition of Birmingham's annual civic review, "The City of Birmingham Handbook," deals with the progress of civic government in that city through the past century, and illustrates the evolution of the vast municipal machine of today from its vague and distant origins. Beginning with an account of Birmingham's historic associations—the city has a well defined history reaching back to pre-Conquest days—the handbook describes the town of a hundred years ago and the conditions then existing. Subsequent pages in this 344-page book relate chapter by chapter the duties and responsibilities of the 26 main administrative departments of the Corporation, concluding with a description of the great airport scheme, the newest form of local government activity, which is due for completion this year.

Dean and Dawson Holiday Travel.—We have received the following holiday travel publications from Dean and Dawson Limited, of 7, Blandford Square, London, N.W.1: "Holidays Calling," setting out examples of the facilities offered by this firm for holidays of every kind abroad; "Cruises and Voyages, 1938," presenting luxury cruises by liner in the Mediterranean, Atlantic, and Baltic; "Easter Holidays," divided into two parts—abroad and at home—offering opportunities for brief holidays at moderate charges during the forthcoming Easter; "Italian Train Cruise," the itinerary of which includes Stresa, Milan, Venice, Florence, Naples, Capri, Pompeii, Rome, Tivoli, Genoa, and Paris. There is no night travel on this £24, 15-day conducted tour; "Danube Special," a conducted 15-day tour by special train to Vienna, Budapest, Innsbruck, Milan, and Paris, at a charge of £20; "Budapest-Spa," a tour by special train, centred on Budapest, but including a number of French, German, Austrian, and Italian cities *en route*; "Ocean Travel," a list of passenger-carrying services of principal steamship companies, together with ports of call and various pertinent information; "Motor Tours in Germany,' motorcoach tours' visiting, *inter alia*, the Rhineland, Bavarian Alps, and Austrian Tyrol; Berlin, Potsdam, Dresden, Thuringia, and the Harz Mountains. Three tours are advertised, two nine-day at £15 15s., and the other six-day at £9 9s., both exclusive of extras.

Sands Across the Sea.—A new kind of holiday guide book, aptly entitled "Sands Across the Sea," has recently been published by the Southern Railway. For the first time, the whole of the northern coast of France, from Malo-les-Bains, near the Belgian border, to La Baule, in Western Brittany, incorporating the famous resorts and holiday centres of Picardy, Normandy, and Brittany, has been embodied in one publication. Well-known writers and artists have contributed to the production of this guide, including D. B. Wyndham Lewis, Helen McKie, Maurice Sampson, Aubrey Hammond, and Margaret Bradley. The book is in three sections. Its 454 pages contain an astonishing amount of information. In addition to hundreds of photographs, there are many amusing illustrations in colour, and every phase of Continental holiday requirements has been covered, including a list of golf courses, road maps, comprehensive lists of hotels, *pensions*, maps, details of motorcoach tours, and everything which is likely to be of assistance to the prospective traveller. This publication is modestly priced at one shilling.

Bell Wires.—British Insulated Cables Limited, of Prescot, Lancs, sends a folder listing a series of bell wires for ordinary domestic circuits, or for larger establishments, fire alarms, and other purposes calling for a high-class wire. For use in dry situations, a range of wires with pure rubber insulation is listed, and is supplied in single lengths or in twisted twin and flat twin flexes. Other types are Maconite bell wires, of high-conductivity tinned copper and special insulation; and Pernax wires, composed of high-conductivity plain copper. The Maconite and Pernax ranges are supplied braided and waxed, and the conductors are of 0·036 in. dia.

Electrical Wiring.—An illustrated catalogue from Callender's Cable & Construction Co. Ltd., Hamilton House, London, E.C.4, describes the two forms of the Callender wiring system, using lead alloy sheathed or tough rubber sheathed cables. The junction boxes are of the makers' C.R. type, manufactured from tinned brass, and, consisting of only three component parts, being extremely simple to erect. The covers are a "snap-on" fit, so as to be easily removable for bonding, jointing, and inspection. The various types are described and illustrated in this catalogue, together with clips, clamps, saddles, and a range of standardised accessories for protective, connecting, and earthing purposes.

XUM

THE SCRAP HEAP

Few, if any, boards of directors can boast so strong a contingent of Peers as that of the Great Western Railway. Of the twenty-three directors no fewer than ten are members of the House of Lords. If, as they quite legitimately might, they borrowed Lord Plender, who is one of the company's auditors, they could field a complete cricket XI of Peers. I am not sure, however, that computing the runs made or the wickets taken would call for any great accountancy powers. The other railways fall a long way behind. Numerically, the best the Southern could do would be to put out a coxswainless-four and the L.M.S., with only three director-Peers, would have to content itself with a fencing or squash rackets team. The L.N.E.R., even if a point were stretched to include Lord Burghley, can muster only two, but with his powerful support, it might challenge with impunity any of the others to a whole Olympiad.—*From "The Financial Times."*

* * *

MAIN LINE TRAINS ON THE MERSEY

Although since its electrification on May 3, 1903, up to the present time, Mersey Railway services have been operated as a self-contained unit, the through running with the L.M.S.R. electrified Wirral lines inaugurated last Monday is not the first venture by this route in bringing passengers from further afield into Liverpool without changing. In the steam days, main-line steam trains of the G.W.R. and the L.N.W.R. passed through the tunnel daily. By this means the G.W.R. was able to run its 7.15 a.m. express from Paddington through to Liverpool, a Mersey engine taking charge at Rock Ferry. This, and another G.W.R. through working remained in force from November, 1893, until January 1, 1900. The L.N.W.R. through trains (one daily in each direction) were to and from the North Wales coast.

* * *

In selecting distinctive symbols to display at stations, on the principles stated on this page in our issue of February 18, London Transport has decided against symbolising the film industry either at Elstree or Denham. The reason is partly the danger of evoking jealousy between the two centres of the industry and partly the difficulty of devising an acceptable symbol. Instead, Denham, famous also for its trout stream, will be distinguished by an angler. Elstree, site of Sulloniacae, a post on the Roman Watling Street, will be surmounted by a Roman soldier. The new station at Red Bridge in north-east London will have the Britannia window from the British Pavilion at the recent Paris Exhibition. The Fairlop station, near the city's airport, will be embellished with an aeroplane. At Woodford, which is associated with a ford over the river Roding, there will be an heraldic tree and river. At High Barnet, the site of the battle of Barnet in 1471, red and white roses will be employed in the mural decorations. Mill Hill East will have the crest of the Middlesex Regiment, and Mill Hill (The Hale), which is named from an old mill, will be surmounted by a windmill. At Perivale, which apparently was derived from pear tree valley, there will be a pear. South Ruislip and Ruislip Gardens or West Ruislip, names meaning places with rushes, will have bullrushes in the decoration.

* * *

It is the custom for the storks which are found during the summer months in Germany to migrate to Africa or some other warm climate during the winter months; but when winter arrived in the little Silesian town of Lawaldau one solitary stork still remained. The good folk of Lawaldau, fearing for his survival through the hard Silesian winter, had him packed in a comfortable, well ventilated, packing case and sent by express train the 353 miles to Osnabruck. Here Lawaldau's stork has been accommodated in the special Animals' Home Garden to wait until spring comes. He has been fitted with an identity ring so that he can be distinguished when the storks fly north again, for the people of Lawaldau feel sure that he will return to their little town.

* * *

Although Canadian National trains to and from Val d'Or have been operated from Senneterre, Que., twice daily for some time now, this thriving mining town in the heart of the Quebec gold district has not tired of the event. Val d'Or citizens apparently still believe that the whistle of a Canadian National locomotive is one of the sweetest sounds to be heard. Four times a day, a crowd flocks to the railway station to see the train arrive or depart on the new line from Senneterre to Rouyn, Que., now open as far as Val d'Or. "Old timers" of two and a half years ago, at a banquet given by citizens to provincial and federal ministers and railway representatives, recalled instances when on account of bad roads it took ten days for letters and newspapers to reach Val d'Or.

* * *

STONE SLEEPERS FOR SCIENCE MUSEUM

The days when rails were supported on blocks of stone instead of wooden sleepers are recalled by a gift which the L.M.S.R. has made to the Science Museum, South Kensington. This presentation, which has been made by the company at the instance of its former Chief Mechanical Engineer, Sir Henry Fowler, comprises eight stone blocks, each 20 in. square and 10 in. thick, which were used to support the track on the Leicester & Swannington Railway, opened 106 years ago. The whole of this line was not laid on stone sleepers, but they were used for a total distance of 7½ miles, mostly in cuttings and other places where the ground was liable to be wet. The stone blocks which the L.M.S.R. has presented to the museum were recovered quite recently from Kirby Muxloe station, near Leicester, where they formed part of a wall. They will be used by the Science Museum authorities to support the track carrying the reconstructed *Novelty* locomotive, which took part in the famous Rainhill locomotive trials of 1829, and which had a subsequent working life of 34 years. In 1936 the L.M.S.R. presented to the Science Museum a specimen 15-ft. length of wrought-iron fish-bellied rail used by George Stephenson for the Leicester & Swannington Railway. The addition of these gifts to another specimen of a rail and eight chairs which the museum already possesses, will enable a complete section of track to be shown.

* * *

BAKERLOONACY

This is a song of the Tube—
Let us begin it
By cursing the furies who fight and who bite ev'ry night
To get in it ;
The folk who see red and who tread on the dead
And climb over the slain,
And who step on your face in the race for a place
In the train.
The pack !
The wolves who attack,
Attempting to kill you until you
Fall flat on your back ;
The tigers who tear at your hair and who swear
As they tread on your neck,
Leaving you battered, bespattered and shattered,
An absolute wreck.
From these sharks,
These meek-looking typists and clerks,
May Heaven defend you. They'll rend you —up-end you
(I carry the marks).
This meek-looking, sleek-looking, weak-looking clique
With the Bolshevist brains
Inflamed at the thought that they ought to have caught
Much earlier trains.
Mourn
For the hat that is flat
And the collar of which you were shorn
Shed a tear for the dear little ear that you had
And the bags which to rags have been torn.
Weep for the fellow who tired but who died at your side
As the tide swept along.
He was a victim. They tricked him and kicked him to death,
Though he'd done them no wrong.
This is a Song of the Tube,
A ballad of sorrow,
A grey sort of lay of To-day and a greyer To-morrow ;
A dismal, abysmal, chaotic, neurotic Creation
Of one who was done after running a mile
To the station.

[D. C]

From "The Laughter Omnibus," Faber and Faber, 8s. 6d.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

EGYPT

Royal Wedding Traffic

On the occasion of the royal wedding, special return tickets were obtainable at all stations for journeys to Cairo and back at fares reduced to 70 per cent. of two single ticket fares. They were issued during the period January 18—January 17 at Luxor and stations south of that point—to midnight on January 21. Outward half tickets were available by the trains for which they were issued only, but return halves were valid by any train leaving Cairo up to midnight on January 25. Between January 18 and 25, 151 special trains were run to cater for the rush of traffic.

New Projects

It is understood that when proposals are forwarded to the Ministry for the forthcoming budget, provision of funds will be asked, *inter alia*, for the completion of the El Buseilli—Sidi Ghazi line, and the El Taufiqia—Hôsh Issa, —Dilingât—Mallaha relief line. Both these projects have been under consideration for some time, and work on the former has already been completed as far as Mutubis on the east bank of the Nile, over which a fine bridge has recently been constructed to carry the new line. It is required as the main line between Itiayi El Barûd and El Mallaha has reached its maximum freight-carrying capacity during busy seasons. This congestion is due to the fact that all goods traffic between El Qabbari and Upper and Lower Egypt converges on this section. Moreover recent extension to El Qabbari marshalling yard affords a potential goods train output in excess of the present carrying capacity of the section between El Mallaha and Itiayi El Barûd. The proposed alignment of the relief line, instead of merely doubling the existing track between El Mallaha and Itiayi El Barûd, has the advantage of opening up and developing a new district in the Behera.

Progress of Work at Nag' Hamadi

Two spans of the new bridge have now been erected and are nearing completion. Five piers have already been completed, and the remaining piers are expected to be completed by the end of July, 1938, before the Nile flood commences. The bridge when completed will be carried on two abutments, one pivot pier, and six ordinary piers. The eastern abutment has been constructed in the form of a pier so as to allow of an additional span being added when required for the training of the river. The bridge is expected to be completed in April, 1939.

The remodelling of the station has not yet been begun but the acquisition of the necessary land is in hand, and the remodelling is expected to be completed by about April, in next year. The new bridge will afford considerable traffic facilities, as at present only category " IV " engines may work over the existing bridge, which limits the maximum load to nine bogies. The heavier types of engine will then be able to work south of Sohag, and hence the maximum loads of trains will be able to be increased to 12 bogies. The present restriction sometimes necessitates the running of trains Nos. 86/81 (de luxe), Cairo—Luxor, when trains Nos. 88/89, if strengthened, would have sufficed for the heavier traffic arising during the tourist season.

Western Desert Line

In connection with the recently-concluded Anglo-Egyptian Treaty, a sum of £E.345,000 has been sanctioned for the construction of the Western Desert line from Fûka to Mersa Matrûh, which work has already been carried out, and for the strengthening of the line now in hand. A further sum of £E.230,000 is now under approval to cover the cost of reconditioning the Western Desert line between Mex and Fûka.

E.S.R. Receipts for First 9 Months of Current Financial Year

For the first nine months of the current financial year (May, 1937—January, 1938) the receipts of the E.S.R. showed an increase of £E.120,000 over the same period of 1936-37, being £E.3,992,000 as against £E.3,872,000 in 1936-37. The following are some of the figures included in these totals and connected with them:

Passenger earnings,	1937-8	...	£E.1,622,000
" "	1936-7	...	£E.1,583,000
Increase	1937-8	...	£E.39,000
Goods earnings,	1937-8	...	£E.2,295,000
" "	1936-7	...	£E.2,207,000
Increase	1937-8	...	£E.88,000
Other transport,	1937-8	...	£E.75,000
" "	1936-7	...	£E.82,000
Decrease	1937-8	...	£E.7,000
No. of passengers,	1937-8	...	28,394,000
" "	1936-7	...	27,638,000
Increase	1937-8	...	756,000
Goods tonnage carried,	1937-8	...	6,217,000
Goods tonnage carried,	1936-7	...	5,724,000
Increase	1937-8	...	493,000

VICTORIA

" Spirit of Progress " Stewardess and Timekeeping

The first train stewardess in Australia is now travelling on the " Spirit of Progress " daily in each direction between Melbourne and Albury.

From September 27 to December 8 last the trains running to the new fast schedule between these points covered 26,289 miles in the course of 138 trips. On only three occasions was any time lost booked against the locomotive, the aggregate loss being 13 min.: a fine tribute to the modified " S " class engines and their crews. [In our issues of December 17 and January 7, we gave the schedules and enumerated the difficulties encountered in their strict observance.—Ed. *R.G.*]. During the first fortnight that the " Spirit of Progress " stock was used on this train, punctual arrivals at Melbourne were recorded on every occasion, and only once was it 2 min. late at Albury.

NEW ZEALAND

New Chilled Beef Wagons

A trial run of some of the new wagons for the transport of chilled beef was carried out, early in January, from Wairoa, Hawke's Bay, to Wellington, and was a complete success. The beef was put aboard the steamer in almost perfect condition, with a drop of only 2° in temperature from the time it left the works. The rail distance was about 300 miles, yet the loss of temperature was no greater than is recorded in the transport of chilled beef from Longburn to Wellington, a distance of only 84 miles.

Increase in Fertiliser Traffic

In New Zealand every encouragement is given to the use of fertilisers by the provision of extremely low freight rates by rail, a portion of the cost of which is borne by the Agricultural Department. For the year ended March 31, 1937, the quantity carried was 746,000 tons. The increase shown for the portion of the present financial year to December is 162,000 tons, and there is little doubt that when the figures for the whole of the financial year are available, the quantity carried will be found to have exceeded 900,000 tons. The quantity carried in 1934 was only 552,000 tons, so it will be seen how phenomenal is the increase in this traffic.

Workshop Activities

To provide for the expansion of traffic expected during the next few years, and to replace rolling stock due to be scrapped in the near future, the railway workshops construction programme is the largest yet put in hand in the Dominion. An important item in this programme is a further 26 locomotives of the " K " class, 20 in the North Island and 6 in the South Island. As a safety measure, laminated springs are being fitted to four-wheeled vehicles which in the past have had coil bearing springs; the number of goods wagons to be re-equipped in this way totals 12,000.

The construction of 32 additional bogie vans for the carriage of chilled beef is in hand, and 18 of them were completed before Christmas; the remaining 14 are to be finished by the end of March. There will then be 75 of these specially fitted wagons in the Dominion.

Included in the programme now in hand at the Otahuhu workshops are

20 brake vans, 18 new type first class cars, 6 combination day and sleeping cars, and 39 second class carriages. There will also be constructed 1,240 open four-wheeled wagons, 12 horse boxes, 75 cattle trucks and the equivalent of 360 sheep trucks.

Record Rail Traffic

The excellent weather experienced over the Christmas and New Year holidays was responsible for an unprecedented increase in railway passenger traffic. The main trunk systems in both Islands, in particular, have recorded exceptionally heavy traffic, and it is expected that the gross revenue for the current financial year ending March 31, 1938, will establish a record in the history of the New Zealand railways. Figures for the Auckland station up to January 8, showed an increase of £2,500 for the Christmas period as compared with the previous year's total, and since then there has been no decrease in the volume of traffic. Goods traffic and the refreshment branch have also shown heavy increases. The policy of duplicating services rather than running long, heavy trains has been of material assistance in coping with the pressure of traffic.

Modern Traffic Development

It is only in comparatively recent years that Sunday traffic to seaside resorts has developed in New Zealand, thanks to the provision of adequate regular train services at special low day-fares. How popular these have become is seen in the figures for a recent Sunday when 7,000 passengers were conveyed by these trains; one seaside resort alone, Timaru, on the east coast of the South Island, accounted for 2,600 passengers from 100 miles north and 130 miles south.

Popular Refreshment Services

During the four weeks ended January 8, 1938, there was a remarkable increase in refreshment room and bookstall revenue, the former amounting to £8,200 over the figure for the corresponding period of the previous year, and the latter to £3,664. In each instance the revenue for the period was the highest ever recorded. At Wellington station 22,191 meals were served, and there were 55,318 customers served in the cafeteria, and 126,830 at the bookstalls.

CANADA

New Type of C.N.R. Standard Wagon

Two thousand steel-sheathed box cars with wood linings and ceilings have been ordered by the Canadian National Railways, and will be delivered this spring. The Eastern Car Company of Trenton, Nova Scotia, and the National Steel Car Corporation, of Hamilton, Ontario, will each build 700, and the Canadian Car & Foundry, Montreal, will build 500. Complying with the increased demand of freight shippers, for greater cubic capacity, the cars will be wider and higher, as were the 3,000 built for the railway last year. They will conform to the standard length of 40 ft. 6 in., but they will be eight inches wider than the former type—9 ft. 2 in. instead of 8 ft. 6 in.—and 10 ft. high, against the former 9 ft. Cubic capacity will be more than 3,700 cu. ft., an increase of nearly 500 cu. ft., a feature of particular benefit to shippers of cereals, furniture, canned goods, and other bulk products. On the other hand, each of the new cars will be approximately 1,700 pounds lighter than the old, though it will have a carrying capacity of over 45 tons.

Level Crossing Abolition

The Quebec Provincial Government plans elimination of level crossings over railway lines as a feature of the second year of its five-year-plan for improving highways. During the past year eighteen level crossings have been done away with by building tunnels or bridges, or by re-routing the highways. At present the Provincial Roads Department has men working on fifteen additional crossings, and hopes to have the work completed in time for the opening of the motoring season, after the snow goes. Work on several other railway crossings will be begun later in the year.

CEYLON

Retrenchment

The track of the Ceylon Government Railways is being divided for purposes of maintenance into first and second class lines. The Acting Minister of Communications and Works in his observations on the railway retrenchment proposals states that the following lines will be considered second class and maintained accordingly:—

Batticoloa-Trincomalee light railway; Buttalam line beyond Negombo; Kandy-Matale line; the Kelani Valley line beyond Homagama; and the Uda Pussellawa line.

The Acting Minister explains the loss incurred by the working of railcars (during 1935-36 the loss was Rs. 118,768) as due mainly to heavy repairs. Some of the cars have already exceeded their economic life and the most recent ones were put into service as long ago as 1928. The loss might have been a profit if sufficient railcars had been available to replace those under repair, and the necessity to run short steam trains in their place obviated. At least two new railcars must be provided for in the next railway estimates. A sum of about Rs. 1,865,604 is expected to be saved annually if the various retrenchment proposals are adopted.

Railway Coal Bill

A campaign is to be launched to lessen expenditure on fuel, mainly coal, which averages nearly two million rupees annually. An experienced driver with a record for low coal consumption is to be appointed to make a special inspection of the locomotives on all sections and report on ways and means of reducing the consumption of fuel. Such a reduction lies to a large extent in the hands of individual enginemen, and in 1936 they succeeded in reducing fuel consumption from 56·19 to 54·02 lb. per engine-mile.

Rush of Goods Traffic

Every available goods wagon on the Ceylon Government Railway has recently been requisitioned to cope with an unusual rush of traffic. Goods specials are being run and ordinary trains are being utilised to their fullest capacity. The rush has been due mainly to the fact that a large number of lorries had temporarily gone out of service pending the taking of licences by them for the new year. As the new regulations with regard to the licensing of buses and lorries are being strictly enforced now, the owners of these vehicles have withdrawn them from the road to effect the necessary repairs and adjustments so that the authorities may not raise objections towards licensing them.

INDIA

Madras Suburban Service

There are 150 trains a day on the Madras suburban section of the South Indian Railway, affording a six-minute service during the busy hours. This compares very favourably with the suburban train services in many foreign capitals. When the abolition of first class accommodation on the Madras electric train services was decided, 13 tri-composite, and 5 third class multiple-unit coaches were converted into second and third composites in July last. It now appears that in order to cope with the increasing traffic, it is necessary to convert six additional third class units into second and third composite units. The work has been taken in hand and will be completed before the close of the official year.

Track Improvements

To permit the running of heavier engines on the Katpadi branch, the South Indian Railway proposes to replace the existing 41¼-lb. rails on the main line through loops at stations with 50-lb. rails.

FAR EAST

Kiaochow-Tsinan Railway

A report dated January 22, 1938, from Tsingtao states that the railway is under the control of the Japanese military forces and that repairs to the line are in progress under the direction of Japanese engineers, presumably directing Chinese labour. Normal

traffic will not, of course, be fully resumed until the line is handed over from military to civil control. It is expected that a service can be begun before long and rolling stock is being repaired as quickly as possible. About fifty engines and 200 carriages will be available for the resumption of service.

SWITZERLAND

Rhaetian Railway or Viafier Retica

Recognition of Romansch as the fourth national language in Switzerland (as distinct from the official languages, which will still be German, French and Italian only) was secured on February 20, when appropriate legislation was submitted to popular vote and carried by an overwhelming majority in all parts of the country. Romansch is spoken only in the Canton of Graubünden (Grisons) and certain adjacent valleys; it is an ancient tongue which has many features of considerable interest to linguists, and efforts have for some years past been made to stimulate its use, particularly with regard to literature. The territory concerned is, roughly, that covered by the narrow-gauge Rhaetian system—which, incidentally, will be celebrating next July the 25th anniversary of the opening of its last section—and it is noteworthy that this railway has contributed to the support of the language by adding "Viafier retica" to the better-known appellation of "Rhätische Bahn" on its letterheads and other documents.

FRANCE

Winter Sports Traffic

Winter sports traffic on the French railways has become an important feature of the Christmas holiday season. Some figures just issued by the National Railways Company show that the greater part of the traffic is on the South-East lines (former P.L.M.) which lead to the principal snowfields. Between December 22 and January 2 last, the Gare de Lyon dispatched 141 trains to winter sports resorts, compared with 135 in the 1936-37 season. The busiest day was December 22, when 33 trains were run in addition to the ordinary holiday traffic. The Gare de l'Est dispatched 16 trains, instead of 12 the previous season, and the South-West lines (former P.O.-Midi) ran 11, instead of 13 trains. In all, the three stations dispatched 168 trains instead of 160 in 1936-37. The return rush took place on January 2, 3, and 4, when 75 trains from winter sports resorts arrived at the Paris termini. The winter sports traffic thus comprised 243 trains out and in, compared with 232 in the Christmas season 1936-37. This traffic was in addition to the ordinary and the special holiday train services to and from all destinations. In addition, the winter sports brought traffic from the great provincial centres, such as Lyons, Marseilles, Bordeaux, and Toulouse. Traffic from England accounted for the dispatch of 35 trains from Boulogne to Swiss and French winter sports resorts.

Paris Metro Receipts

Traffic receipts of the Paris Metropolitan Company showed a substantial increase in 1937. This was mainly due to the increase in fares on May 31 and again on August 9. During January and February the receipts diminished by fr. 1,864,041 in comparison with the same period in 1936, but they began to rise again in March before the fares were raised. The receipts for the year were as follow:—

	Receipts, 1937 Fr.	Incr. or decr. Fr.
1st quarter ...	132,553,728	— 816,120
2nd ,, ...	135,000,762	+ 12,892,612
3nd ,, ...	153,639,386	+ 53,838,560
4th ,, ...	191,240,251	+ 56,258,102
Total ...	612,434,127	+122,173,154

U.S.S.R.

New Standard Locomotives

At the Paris Exhibition last year two of the new standard types of locomotive now being built in considerable numbers for the State Railways of the U.S.S.R. were shown. [See illustrations on page 534.—ED. *R.G.*] One was a 2-8-4 passenger locomotive of the "Joseph Stalin" class, generally known as type "JS," and the other a heavy freight locomotive of the "Felix Dserjinsky" or "FD" class with 2-10-2 wheel arrangement. Both incorporate the same standard boiler, cylinders, 12-wheeled tender, and as many other details as possible. The leading dimensions are:—

Type	2-8-4	2-10-2
Cylinders (2), diameter ...	26⅜ in.	26⅜ in.
,, stroke...	30¼ in.	30¼ in.
Driving wheels, diameter ...	6 ft. 1 in.	4 ft. 11 in.
Heating surface, total	3,175 sq. ft.	3,175 sq. ft.
Firegrate area...	75·3 sq. ft.	75·3 sq. ft.
Working pressure, per sq. in.	220 lb.	220 lb.
Weight in working order ...	237 tons	237 tons
Length of engine and tender ...	94 ft. 10 in.	93 ft. 3 in.
Coal capacity of tender ...	20 tons	20 tons

Both types are equipped with mechanical stokers, automatic couplers, and compressed air brake. The 2-8-4 "JS" type locomotive is designed for a maximum speed of 90 m.p.h., and the 10-coupled "FD" engine 59 m.p.h. The transport of these two locomotives to Paris from Havre, where they arrived by sea from Leningrad already equipped with axles for the 4 ft. 8½ in. gauge, necessitated the removal of chimneys, boiler mountings, cabs, and cylinder-covers, in order to clear the structure gauge.

A further standard type with the same main features is a 4-6-4 for high speed passenger trains, the first of which has recently been built at the Knibyshev locomotive works at Kolomna and is said to be designed for a maximum speed of 125 m.p.h. It is understood that this was the engine, fitted with a tender condenser, which recently hauled a train of 1,200 tons from Moscow to Vladivostock and back, a distance of over 13,000 miles in 240 running hours. It is stated that when this type of engine becomes generally available the Moscow-Leningrad journey time will be cut down from the present 10 hr. 42 min. to less than 6 hr. with 600-ton trains. The use of condenser tenders is apparently to be extended in Soviet Russia where water difficulties are a severe handicap in many parts.

The rolling stock construction programme for the current year includes 40,000 bogie freight cars, 2,100 passenger vehicles, and streamlined electric trains, the last-mentioned to be built by the Mytishchy works. An air-conditioned car is to be built experimentally, and vehicles containing hairdressing saloons and bathrooms for the Trans-Siberian express.

COLOMBIA

National Railways: Results for First Half, 1937

The Administrative Council of the National Railways has published the results of working for the first semester of 1937. The figures refer only to the system under the direct control of the Council, comprising the Pacifico, Girardot, Central Northern, Barraquillo, and Nariño lines. The results are given as follow:—

	$	$
Gross earnings ...	—	6,322,947
Working expenditure	4,713,564	—
Additions, 6 per cent.	379,377	5,092,941
Net earnings	—	1,230,006
Insurance, &c. ...	—	564,373
Working capital credit	—	100,000
Surplus to National Government ...	—	565,633

The total number of paying passengers was 2,621,695, that is, 40,529, or 2 per cent., more than in the first six months of 1936. Goods tonnage was 502,536, as compared with 480,640, or 5 per cent. more.

The Council, in its *Monthly Review*, calls attention to the misconceptions existing in the matter of tariffs, inasmuch as while a member of the Senate is accusing the railway administration of hindering, by high tariffs, the normal industrial development of the country, a memorial has been received in the legislature from the road motor interests complaining that the railways, by reducing their tariffs to a competitive basis, are ruining the business of transport by road. This coincidence, the Council claims, constitutes the best testimony to the efforts of the administration to carry out, in letter and in spirit, the intention of Law 29, which enjoins that the operation of the railways shall be conducted on commercial lines but with due regard to the general economy of the country.

XUM

PLANNED PUBLICITY*

A specialised market—Works co-operation—The publicity budget—How to make a beginning

THE class of manufactured products whose marketing is to be discussed in this paper may be defined as "engineering products made by technical men and bought by technically-minded men for some specialised technical purpose." It will be seen that this definition excludes at once such products as motorcars, typewriters and radio sets, for although these are the complicated products of engineering skill of a high order, they cannot be said to be bought for specialised technical purposes nor, in general, by technically minded persons.

The market for engineering products, being specialised, is a limited one; its limits may range from a few dozens of potential customers to a few thousands, but they rarely exceed the latter figure. The general product has a national market, limited only by the number of that section of the community whose income level can absorb it. As a consequence, the route of approach to the potential customer is, for engineering products, more difficult.

Selective Channels

Care must, therefore, be taken to select the recipient carefully, to approach him through channels which are in themselves highly selective (trade and technical press, and direct approach through the post), and to ensure that the information which reaches him is specific to his own needs.

A man will buy a motorcar for many reasons other than to provide transport or because his old one is worn out, and these reasons involve personal idiosyncrasies, personal taste, personal needs, and personal emotions. He may deny himself other things to buy it; he will make sacrifices. He is usually not much concerned about the innerness of its design or construction, about the material of which the crankshaft is made, or the tooth angle of the back-axle gears. The same man in his capacity of purchaser of engineering products does not buy a gas-holder or a filter press or an automatic loom because he admires its lines. He buys only after a critical examination of his need for it, of its design and materials and construction, of what it will do, what it will save or earn in hard cash.

The buyer of engineering products is usually at least as well informed as to his own requirements as is the seller. In fact, the buyer frequently draws up a schedule of his requirements in the form of a rigid specification, with full knowledge of the import of each item and the reason for its inclusion, together with some tightly binding clauses as to output under specified conditions or efficiency expressed as a percentage.

Contrast this with a washing powder, the purchaser of which is completely ignorant of its composition, properties, true cost and efficiency, and is content to take these "for granted."

The "Works" View

It is astonishing how the "works" point of view persists in the mind of the manufacturer of engineering products, regardless of the fact that the buyer is not greatly interested in what goes on inside your own works.

Wipe all pre-knowledge from your mind; go to the research and design departments, to your shop superintendents and works managers, and, furnished with a list of questions which you have drawn up, do not rest content until you have answers to every question.

Engineering products are mostly sold direct to the customer, but this is by no means the whole story. Even if the product is sold direct by you to your customer, it does not follow that he is the only person upon whom your selling effort should concentrate. The ultimate consumer may be very remote from you, yet it is he who may really influence buying. (For instance, an automobile manufacturer may buy valves from a machinist who buys stampings from a stamper, who in turn buys rod from the re-roller who buys billets from the actual steel maker! The steel maker must cultivate not only the re-roller (his immediate customer), but the ultimate user, in order to get his steel specified).

The Purchasing Agent

It is often necessary to go beyond the purchasing agent at a works, to the works manager, shop superintendent, metallurgist, or whoever really decides what shall be bought. The more highly specialised an engineering product, the more necessary it is for one's sales promotion efforts to reach past the purchasing agent. Conversely, the more standardised and competitive the product, the more it pays to cultivate the purchasing agent. It might, for instance, be scarcely worth while endeavouring to promote the sale of belt fasteners by adding a works manager's name to your mailing list, but it might possibly be worth while to add it if you were selling milling cutters, and certainly if you were selling an expensive multiple drilling machine.

Taking Things for Granted

Inquiry will often bring to light unexpected facts. The author recollects one instance in which it had been taken for granted for years that a certain product was not suitable for the plant to make in the larger sizes, though they were admittedly the most profitable. All newcomers were told this, and it became so generally accepted that nobody bothered to dig down to the true reason. Finally, an investigator discovered that the limiting factor was nothing more than the length of an annealing furnace, which could be extended for less than £30! But the sales staff never discovered that for themselves; they had simply been told that the works could not undertake the work, and, therefore, had ceased to bother about getting inquiries for it.

The first step in planning the actual campaign is to arrange the publicity allocation or budget. There is no golden rule to fix the amount of money which can be allocated to a publicity campaign. Some firms allot a proportion of the previous year's turnover or profit; this method has the disadvantage that in times of depression publicity effort is restricted, when in almost every case it would be logical to make increased selling efforts in bad times. The allocation of a fixed annual sum, to be apportioned as required, is a better method, but the best method of all is perfectly arbitrary—to allot what can be afforded as and when it is required and for the ends it is desired to attain. The question as to what *can* be afforded, naturally depends on circumstances: it should be borne in mind that the object of engineering publicity is to spend money to earn sales, and it is futile to be niggardly.

The sum allotted to any campaign should not be so low as to be below the point of "minimum coverage," that is, the point at which the allocation is spread so thinly for the work it is expected to do that it is ineffective. On the

* Abstract of paper read by Mr. F. Rowlinson before the Manchester Association of Engineers on February 25

other hand, expenditure is limited in an upward direction by the point of "diminishing returns" at which each additional increment of expenditure is not recouped by the additional business it influences. These points, in the author's experience, are separated in something like a ratio of one to ten.

Skeleton Plans

A way of approach for the raw beginner is to prepare two skeleton plans of campaign, the first envisaging the utilisation of every reasonably suitable journal with full pages at frequent intervals, with rather lavish expenditure upon elaborate brochures, and with a very generous amount of printed matter and circularising. This might cost £2,500 for a certain product or group of products. Secondly, examine now what would be the cost of, say, a quarter-page monthly in the two leading journals in the field, with a modest four-page leaflet and half-a-dozen circular letters; £250 would, perhaps, just cover this. Then it could be assumed that the extremes of "diminishing returns" and "minimum coverage" had been discovered, and the allocation might then be fixed at about £1,500 for a first year's approximation with a reasonable certainty of substantial response without over-lavish expenditure. The second year's appropriation could then be determined on the results of the first year.

Of course, a few years' experience will enable one to fix appropriations by less clumsy methods than this, but the method outlined will at least prevent such absurdities as one which recently came to the author's notice. In this case, having just completed erection and equipment of a plant which cost about £125,000, a prospective client called the author into consultation and proposed to allot the sum of £250 per annum to advertising and building up the sale of the new product for which the plant had been specially built!

Advertising Media

The logical medium for advertising engineering products is the trade and technical Press, since this affords:—

(1) Selective coverage and circulation, having as readers only men engaged in industrial work.

(2) Comparatively low cost for space, compared with the national press.

(3) General appeal in journals covering many industrial activities.

(4) Specialised appeal in journals covering specific industries.

The question of advertising engineering products in the daily press can be at once dismissed on the grounds that this channel of advertising is too diffuse and expensive.

Exhibitions are a subject in themselves, and it is not proposed to deal with them here.

Stick only to the well-known and established journals, and do not take space in any unknown journal, no matter how well produced.

Special and Co-operative Pages

Avoid, also, "special" and co-operative pages in the daily press, even if the pages are sponsored by some customer whose business you value. They are expensive and usually quite valueless.

Far too often it will be found that the sales promotion of engineering products is the part-time job of a director, or is tacked on to the work of a sales manager, the secretary of the company, or is given to a junior.

Sales promotion, if it is to be properly done and planned, should be the full-time—or at least the major—care of some properly appointed and qualified person. This person should have industrial experience, preferably in many industries, a technical training, and some knowledge of marketing and market research.

He should have also some real ability and experience of the laying-out of advertisements, the writing of "copy," of photography and art work, the drawing-up and printing and different kinds of printed matter, for these matters have their own technicalities, and these technicalities cannot be acquired in a day, even though we all have the necessary tools therefor (a pencil and a piece of paper!) to our hand.

Responsibility

Such a person cannot be hired for £3 a week, nor is it fair to expect a junior ably to do such work. The man appointed (let us call him sales promotion manager or publicity manager) must be a person of some judgment, for upon him, in conjunction with the sales manager or sales director, will fall the framing of sales policies, and he will have to carry these policies into execution.

He should not be a mere mouthpiece—a person of no status to be badgered or overruled, whose work is to be "submitted" to the secretary for re-hashing and re-submitting to the board, who will edit it out of all value it may once have had; he must have the full confidence of the firm behind him, for he is to be admitted behind the scenes. His status should be well defined and his abilities should command a fair salary.

In far too many engineering firms the tendency is to "do some advertising" in a perfunctory manner: space is bought in a variety of trade and technical journals, and the space so bought is filled at the last minute with hastily prepared "copy" in accordance with no definite plan. Catalogues and printed matter are prepared, often on expensive lines, but without real regard to whom they are aimed or what is to be done with them; too frequently they repose on the stores shelves till they are dusty and obsolescent. Publicity in these cases becomes a "thing apart" from the general structure of the business, having no relation to other aspects of the sales organisation. The money spent upon it is, consequently, wasted.

To all who have "done some advertising" along perfunctory lines, the plan outlined by the author will offer a way of approach along new lines—those of planned publicity, or sales promotion.

Light-Sensitive Control Devices

The use of light-sensitive devices to control various industrial processes has been considerably extended of recent years; such appliances have also been incorporated in an automatic train control system, a tail-signal detector, a substitute for track circuit point locking, and a method of controlling escalators at stations, where current can be saved by not allowing them to run continuously, as described in our issue for November 30, 1934. They have also been proposed, and we understand tried, in connection with the fascinating problem of axle (or wheel) counting, where a very rapid-acting device is necessary and no little difficulty has been encountered in constructing a mechanical treadle that is really satisfactory for any but moderate speeds, although the problem has been attacked for over 30 years. With light-sensitive devices, however, the difficulty here has been to ensure that they are acted on by nothing else but the passage of wheels, for the necessity of having them close to rail level exposes them to the influence of leaves, pieces of paper, or other objects drawn past by the draught set up by trains, while birds and mice promenading on the rail have, we believe, likewise had themselves counted. The use of light-sensitive apparatus in railway work is necessarily subject to special limitations not encountered elsewhere.

XUM

FURTHER IMPRESSIONS OF OVERSEAS TRANSPORT

I—The author pays a second visit to Australia in connection with the 150th anniversary celebrations and travels across the continent by rail, noting the various improvements which have taken place in Australian transport during the last three years

By ALFRED W. ARTHURTON, M.Inst.T.

ON reaching Fremantle, the gateway of Australia, the traveller to the Eastern States has a choice of three routes. He may remain on the ship for another 10 days or a fortnight and travel round the coast to Sydney or Brisbane, calling at Adelaide, Melbourne, and Tasmania on the way; or he may travel by Australian National Airways Pty. Ltd. for £33 15s., and reach Sydney in two days and Brisbane in less than three. The third route is overland by the Trans-Australian Railway and its connections, a journey of 3,300 miles which occupies 6 days and 6 nights, and costs £23 14s. 6d. first class, or £14 0s. 6d. second class.

After a delightful voyage in the *Orion*, one of the luxurious new vessels of the Orient Line, which had left Tilbury on New Year's Day; we arrived off Fremantle at 8 a.m. on February 1 (incidentally, the passenger list included Viscount Nuffield, who took an active part in the deck sports on the voyage, and Mr. A. P. Herbert, M.P.). There is always a lot of time wasted on arrival in a fresh country. A preliminary medical inspection by the ship's doctor had taken place the previous day, but we were again roused at an inordinately early hour to bare our arms and foreheads to the Port Medical Officer. Passport and customs examinations also took a considerable time, so that, after a hasty breakfast it was 10.30 a.m. before it was possible to get over to the station and catch a train for Perth.

As illustrating the modern tendency for travel by road, one could not help noticing that most of the passengers boarded the buses waiting alongside the wharf although the railway station was close by and the return fare to Perth was 1s. as against 1s. 6d. by bus. There was also a frequent service of trains and the journey of 12 miles took only half an hour.

Modern Perth

Perth is a delightful garden city situated on the picturesque Swan River. The wide streets, covered footways, numerous arcades, and attractive shops provided a welcome change after a month or more at sea. We noticed many improvements since our visit three years ago. Handsome new buildings and what an American visitor called "baby skyscrapers" have arisen as well as a brand new post office in dazzling white stone and huge banking and insurance premises. The capital of the vast State of Western Australia, the largest in the Commonwealth, wore a more prosperous look than formerly. Well-dressed crowds flocked the streets and not a single beggar or poorly dressed individual was to be seen; a striking contrast to Port Said, Aden, and Colombo in this respect. Wheat, timber and gold are the principal products of Western Australia and the two former have recently brought better traffics to the railways compared with the past five or six years.

A new feature of considerable interest in Perth, especially to visitors from England, is London Court, a paved street of half-timbered houses representing a London street of the olden times. The arched gateway and clock tower with quarter chimes at either end, with the figures of Dick Whittington and his cat, the lanterns hung above the shop entrances and the diamond pane windows give an admirable representation of a London street in Tudor times.

The Western Australian Railways

Many people prefer to go overland from Fremantle to facing the discomforts of the Great Australian Bight which, like the Bay of Biscay, has an unenviable reputation for rough seas and lives up to its reputation. For such, the services of the Trans-Australian Railway and its connections in the various States provide a rapid and comfortable transit. The first part of the journey is over the 3-ft. 6-in. line of the Western Australian Railways to Kalgoorlie, 375 miles distant. There are three through trains a week in each direction. Leaving Perth at 9 p.m. on Tuesday, the day the mail boats arrive from England, in a comfortable two-berth sleeper, which in spite of the narrowness of the gauge is comparatively roomy, Southern Cross is reached at breakfast time and Kalgoorlie just after lunch. There are numerous stations *en route* and the traveller is struck by their names, which are evidently of native origin. Among them are Calooli, Buthabullalong, Ubini, Koorarawalyer, Burracoppin, Killarberrin, Boorabbin, Diwi, and Woolgangre.

Kalgoorlie is the capital city of one of the world's most famous goldfields. From the Golden Mile over £100,000,000 worth of gold has been won since it was first discovered by Patrick Hannan in the early 'nineties. In the early days water was the vital problem, as it still is in many parts of Western Australia, but today water is brought 350 miles from the Darling Range near the coast and plentiful supplies are always available. The huge pipe which carries this water runs alongside the railway nearly all the way from Perth.

Break of Gauge

At Kalgoorlie a change is made to the 4-ft. 8½-in. Trans-Australian Railway, which stretches for over 1,000 miles (1,108 to be exact) to Port Pirie Junction, and there joins the 5-ft. 3-in. lines of the South Australian and Victorian Railways. The train is a model of comfort and equipment. The sleeping cars are roomy and comfortable and shower baths are provided in the first class cars. It is claimed that the restfulness and comfort of an up-to-date hotel are to be found in this train, which accomplishes in the space of 40 hours a journey across the great Nullarbor Plain on which intrepid explorers in early Australian history spent many weary months. The restful lounges and spacious sleeping cabins have been designed to afford the utmost comfort to the traveller, and even a piano is provided for the purpose of impromptu concerts among the passengers.

AIR-CONDITIONING ON U.S.A. RAILWAYS.—Class I railways and the Pullman Company of U.S.A. had 11,168 air-conditioned passenger coaches in operation on January 1 last. Of this number, it is announced by the Association of American Railroads, 6,407 were owned by the railways and 4,761 by the Pullman Company.

MODERNISED STATIONS ON THE WIRRAL LINE, L.M.S.R.

In connection with the electrification, which, as recorded on page 549, was inaugurated on March 14, stations on the Wirral Section have been modernised, notable reinforced concrete designs being a feature

THE stations on the old Wirral Railway were due for renovation, and the electrification afforded an appropriate occasion for undertaking their complete modernisation. The two terminal stations of West Kirby and New Brighton are of the single platform type with a platform line on each side of them. The station buildings themselves were substantial and have merely had to be redecorated throughout. There were no coverings over the platforms at these stations, and reinforced concrete awnings 230 ft. long have therefore been provided. That at West Kirby varies in width from 35 ft. to 40 ft., and the New Brighton awning is about 21 ft. wide. In each case the awning projects 12 in. over the platform coping to afford ample weather protection. The difference in width between the two awnings, and the fact that the New Brighton awning is built on a sharp curve, largely decided the designs.

West Kirby and New Brighton

The West Kirby awning, which was designed and constructed by the Vibrated Concrete Construction Co. Ltd., is supported on two rows of columns at 25-ft. 6-in. centres, arranged to give a clear platform width of 10 ft. on each side, with a tapering centre space. The roof slab is 3 in. thick and of arch form, and is supported on longitudinal beams over the columns and transverse beams at 12-ft. 9-in. centres. The transverse beams themselves form the bottom members of overhead trusses. With the exception of the foundations, all the concrete (in which Ferrocrete was used) in the awning was vibrated. The pre-cast concrete valance was erected after the main roof was completed, and steel projecting from the units was cast into the main roof. Four lantern lights are provided, the awning being too wide for the platform to be adequately lit from the sides.

Features of the New Brighton awning are the smooth soffits to the roof slab, and the unusual arrangements of roof beams. On account of the curve in the awning, it was necessary to keep the roof slab as flat as possible to simplify formwork, and this involved the use of considerable screeding to drain the roof. The awning at New Brighton was constructed with timber formwork, which the contractor elected to line with hardboard. The construction procedure was to cast the overhead roof beams after the slab had been cast. This awning was designed by the railway company's own staff and erected by J. Henshaw & Company of Liverpool.

Common features of the awnings are built-in electric conduits and an expansion joint located midway along the length. The joint at West Kirby is formed with a double column arrangement, but at New Brighton the normal spacing of 27 ft. 6 in. is uninterrupted by the expansion joint. These platform awnings have not been waterproofed, the concrete being sufficiently dense to render this unnecessary.

Intermediate Stations

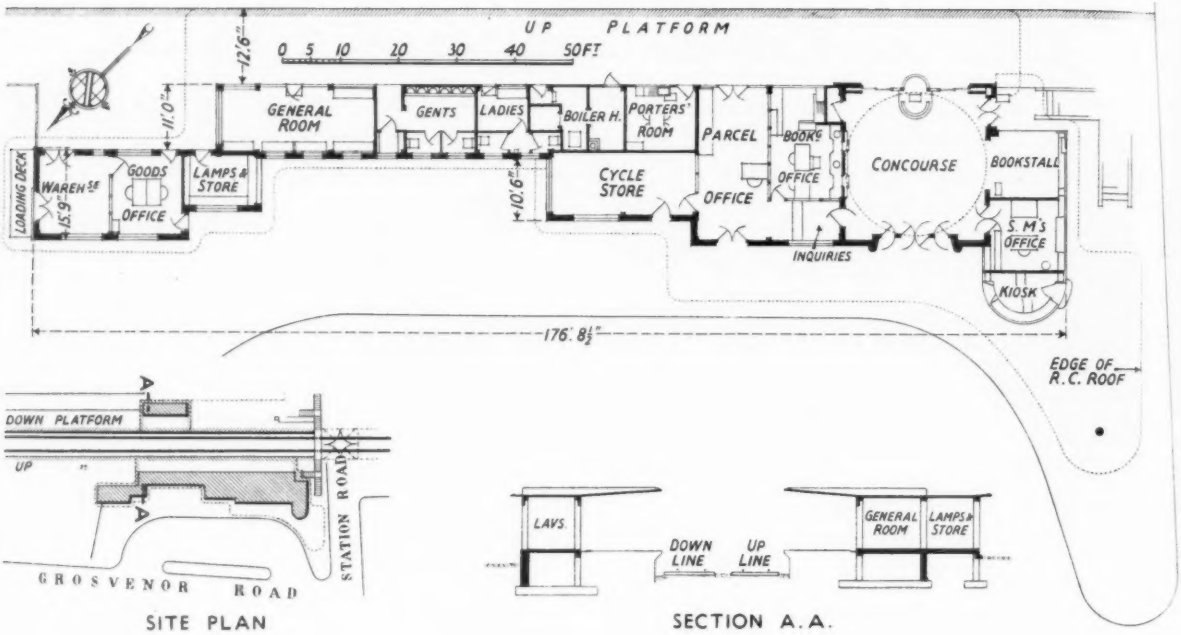
The intermediate stations of Hoylake, Meols, Moreton, and Leasowe are all of the same general design, incorporating platform buildings of reinforced concrete framework with brick filling and ample glazing, and reinforced concrete cantilever platform awnings supported by cantilever beams above, leaving clear soffits beneath. New reinforced concrete footbridges have been provided at all these stations. Meols station, a typical example, is composed of buildings on the up and down platforms, and a separate booking office at road level is connected to each platform by means of a reinforced concrete footbridge. The platform buildings include the usual waiting rooms, porters' room, heating, and lavatory accommodation. With the exception of Leasowe, the building in every case is 10 ft. wide with a 10 ft. clear platform width in front, and with the front edge of the awning arranged just to clear the structure gauge, thus giving ample cover. The frames of the buildings are at 15-ft. centres. Comparatively large strip footings have been found necessary on account of poor ground, particularly at Meols, and Leasowe. The columns are generally 12 in. × 9 in. in section, and the overturning effect of the awning is resisted by a balance wall along the back of the buildings which supports the brickwork and the floor. The floors in Leasowe, Moreton, and Meols stations are of reinforced concrete cast on structural paper on filling, and the soffits of the ceilings are lined with insulating board which was laid on the shuttering and left adhering to the surface of the concrete.

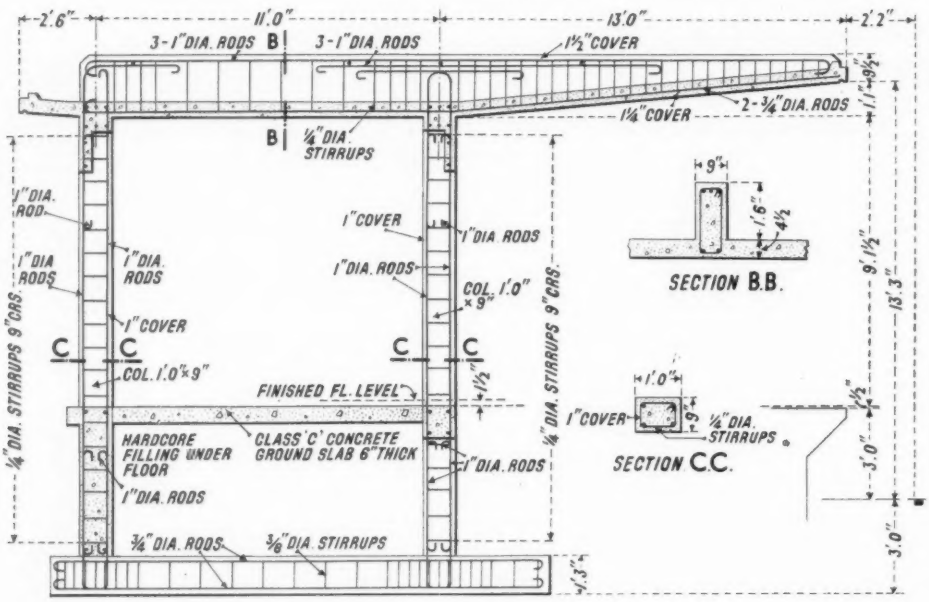
The booking office at Meols was constructed alongside the roadway embankment, the basement of the building forming a cycle store and heating chamber. Access to both platforms from the booking office is provided by staircases and a reinforced concrete footbridge. The girders of this bridge were cast on the platform adjoining the site and are some 42 ft. long. They were hoisted into position with a travelling crane, using a special bridle beam. The floor of the bridge was cast *in situ*, and both the bridge and the staircases are covered in with a timber top.

Hoylake Features

Hoylake station is larger than the three already described and has more elaborate buildings on the up side, with the usual footbridge, and, on the down side, the standard platform building with a 14-ft. awning, necessitating a balance wall 7 ft. 6 in. deep and 1 ft. 6 in. wide cast below the floor. All the floors at Hoylake are formed of mass concrete laid on hard core. The up platform building is some 175 ft. long and the frames are at 12-ft. 6-in. centres except at the west end of the building where the spacing is increased to 25 ft. to accommodate a circular clerestory over the concourse. This large span required an 8½-in. awning slab, but the remainder of the awning is comprised of 4½-in. slabs. This minimum thickness was found desirable on account of the electric light conduits which are permanently buried in the concrete. A notable feature of Hoylake station is the irregularly shaped awning in the forecourt. By means of a heavy rigid frame and one circular column at its extreme end a very large area of roof is carried. The beam of the rigid frame is above the slab, leaving its underside as a clear ceiling.

The footbridge at Hoylake, like that at Leasowe, is 36 ft. 2 in. clear span by 6 ft. wide, with a crown thickness of 9 in. All the footbridges are of the rigid-frame type with varying moments of inertia and were cast

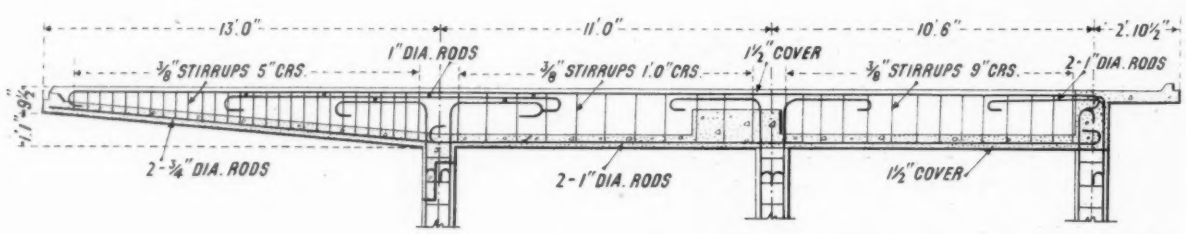




Above: Plan of station buildings, up side, key plan of station, and cross section

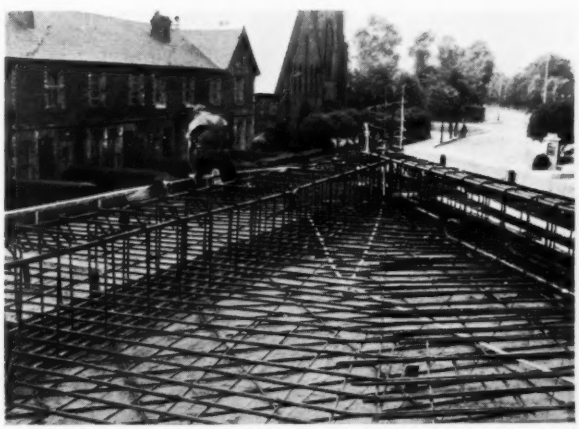
Left: Cross section of reinforced concrete down side platform building and awning (typical of other intermediate stations also)

Below: Cross section through up side platform building and awning



REINFORCED CONCRETE STATION CONSTRUCTION

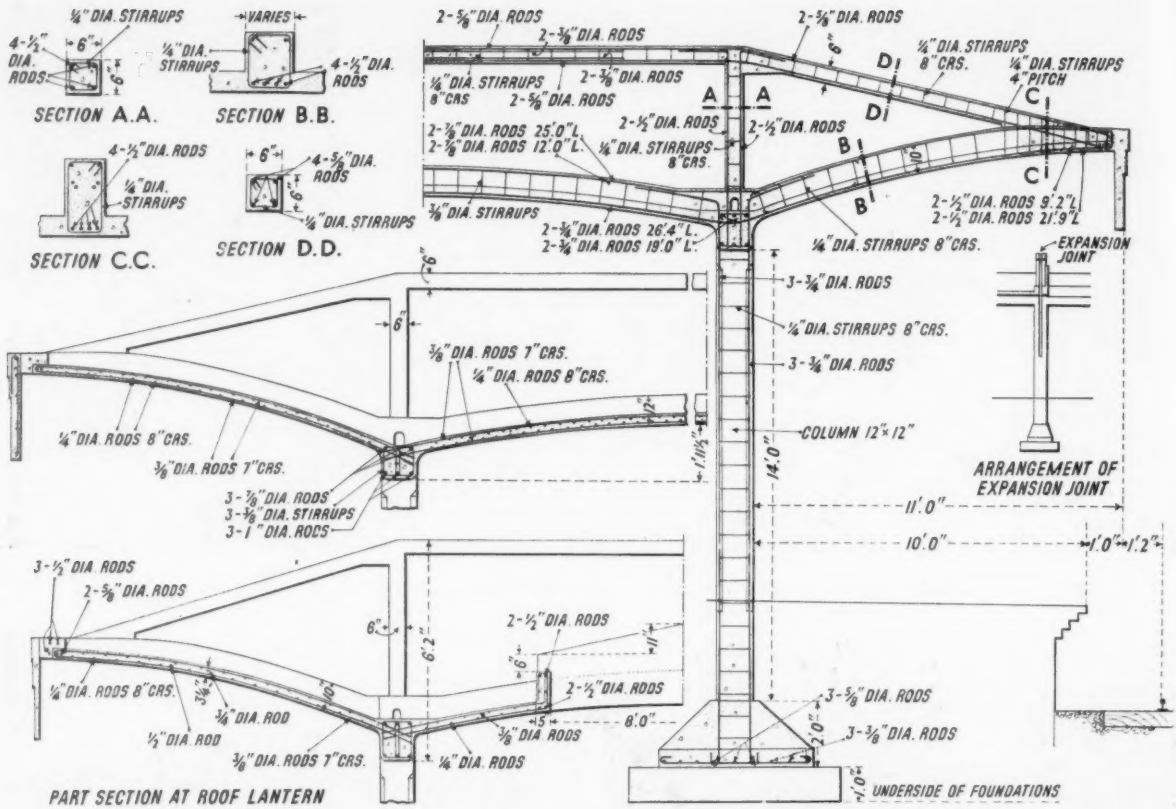
Reinforced concrete station buildings, approach awning, and footbridge at Hoylake



Reinforcement of approach awning (left) showing cable ducts, and of platform buildings and awning (right) at Hoylake

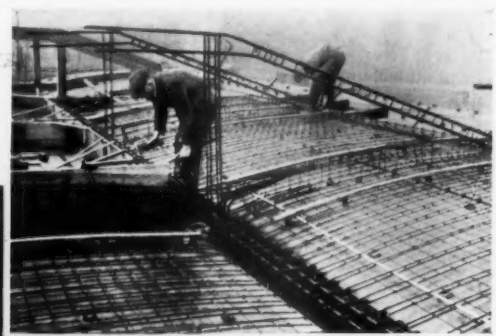
Platform buildings, booking office, and footbridge at Meols

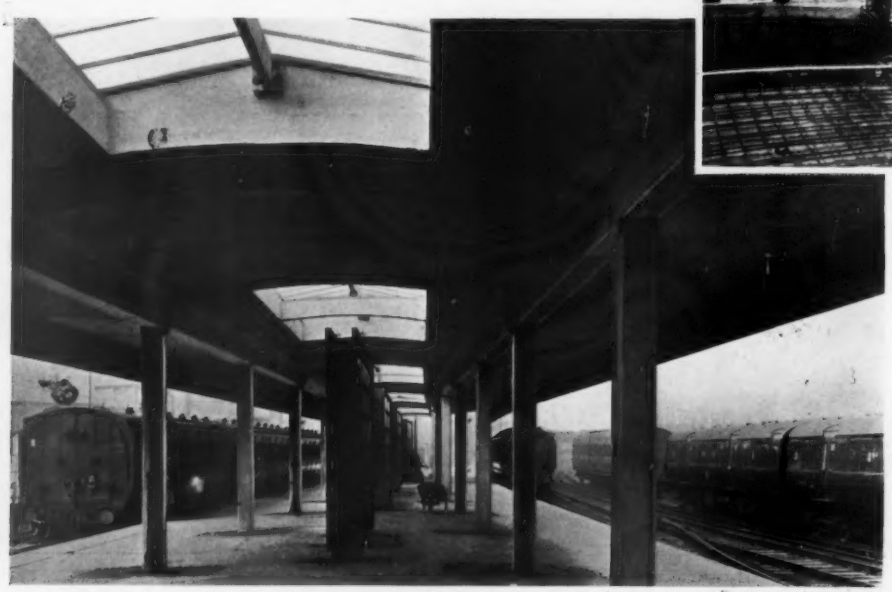
ON THE WIRRAL LINE, L.M.S.R.



Above: Typical cross-sections and details

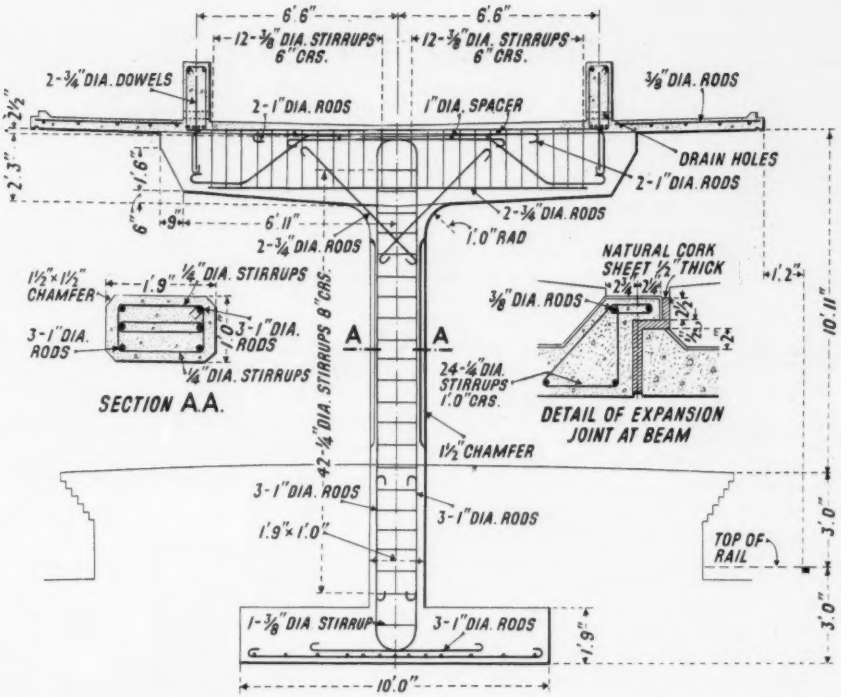
Below: The completed awning with advertisement hoardings down middle of platform





Above: Reinforcement and shuttering being placed

REINFORCED CONCRETE PLATFORM AWNING AT WEST KIRBY, L.M.S.R.



Right: Typical cross section and details of reinforced concrete platform awning at New Brighton

Reinforced concrete platform awning at New Brighton

in situ, the deck frames being suspended from second-hand girders resting on timber trestles. One set of forms was used for the main span of each bridge. The lighting of the bridges is by means of built-in electric fixtures. Pre-cast reinforced concrete lamp posts are used at the main landings, steel projecting from these posts being cast into the parapets of the bridge. A small central heating plant is provided in each building at all these stations. Platforms in each case have been raised to standard height and where formerly they were of timber have been replaced by pre-cast concrete walling. Pre-cast concrete coping slabs have been used, and the back of the platforms is of tar macadam.

The contractor for the reinforced concrete work was Holland & Hannen and Cubitts Limited, of London; the contractor for the brickwork and finishing of the station buildings is Tomkinson & Co. Ltd., of Liverpool. The designs and working drawings of the buildings and footbridges, with the exception of the footbridge at Moreton were prepared by the staff of the Chief Engineer of the L.M.S.R., and the company's staff also carried out the raising of platforms and the provision of new walls.

Special Features of the Meghna Bridge

There are one or two points in connection with the design and construction of the new King George VI bridge carrying the Assam-Bengal Railway over the Meghna river that are noteworthy. In the fabrication of the steelwork, for which the Braithwaite, Burn & Jessop Construction Co. Ltd. was the contracting firm, absolutely accurate steel jigs were used to ensure both that all rivet holes—drilled in the first instance to full size—should accurately register, and that symmetrical members should be completely interchangeable. This obviated the necessity of preliminary erection, and yet the erection at site of 3,500 tons of steel, fabricated at three different workshops, was completed in approximately half the time originally estimated. So much for Indian steel (Tata's) fabricated and erected by Indian labour under British supervision. But equally remarkable are the design and construction of the well and pier joints. To counteract earthquake shocks, and the possible uneven sinking of the two cylindrical wells carrying each pier, a normal rigid capping of the wells has been discarded in favour of a dual cylindrical convex pier base resting on corresponding concave well tops, the whole in heavily reinforced concrete. During construction the well top surfaces were treated with a special lubricant prior to the superimposition of the pier, to ensure a free bearing surface between the three, the whole comprising a twin knuckle joint effect, such that the load might still be equally distributed between the two wells, and stability maintained, even though the whole structure became distorted.

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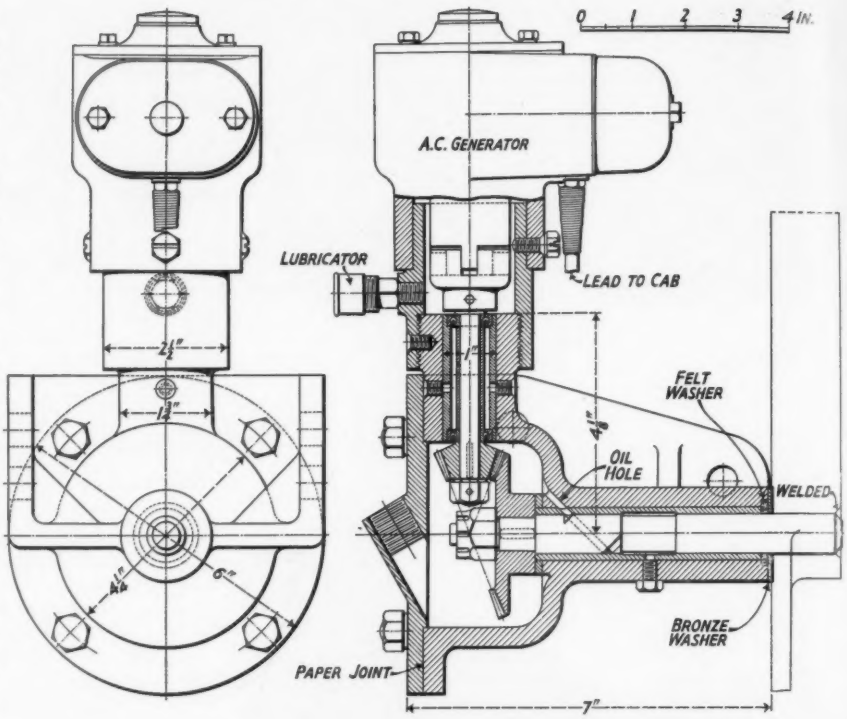
SPEEDOMETERS FOR G.W.R. LOCOMOTIVES

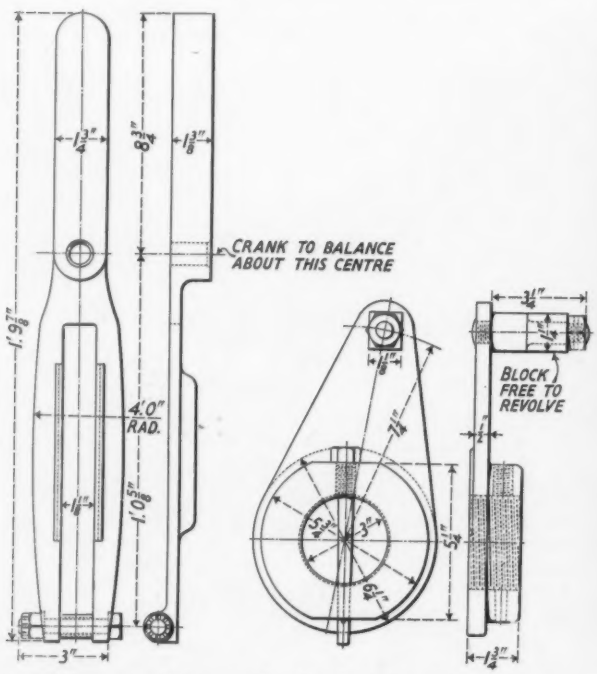
Simple form of apparatus combining mechanical and electrical features

ON page 996 of THE RAILWAY GAZETTE dated December 3, 1937, there appeared a short description of the speedometer equipment fitted to locomotives of the "King" and "Castle" classes on the Great Western Railway, and as then stated, it has been decided to equip engines of the "Star" and "Saint" classes as well. This work is now proceeding.

By Mr. Collett's courtesy, we are now able to reproduce photographs of the driving mechanism and cab fittings, supplemented by drawings showing the general arrangement of the apparatus as applied to the engines, together with detailed views of the gear-box, driving gear, and crank-pin washer. The equipment has been adopted as a G.W.R. standard, and consists of an a.c. generator, and a voltmeter with a scale graduated to read in m.p.h. mounted in the cab. The drive is from a small return crank incorporated in the crank-pin washer of the right-hand trailing driving wheel. A block on this crank engages in a slotted link mounted on a spindle carried on

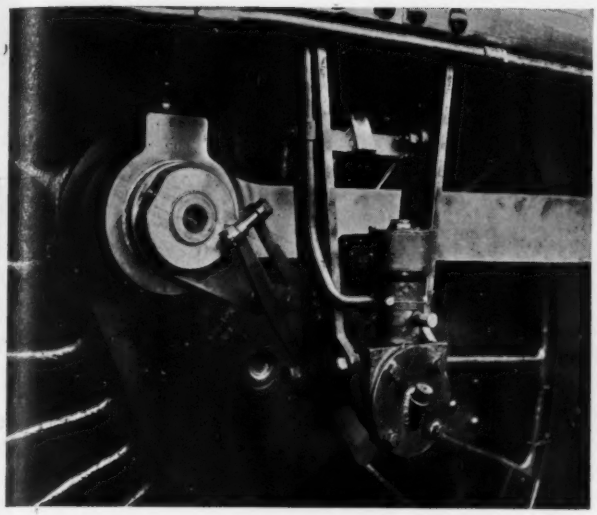


Generator, with bevel gear drive in section



Fittings attached to crank pin of trailing driving wheel

Speedometer dial and bracket fixed in cab

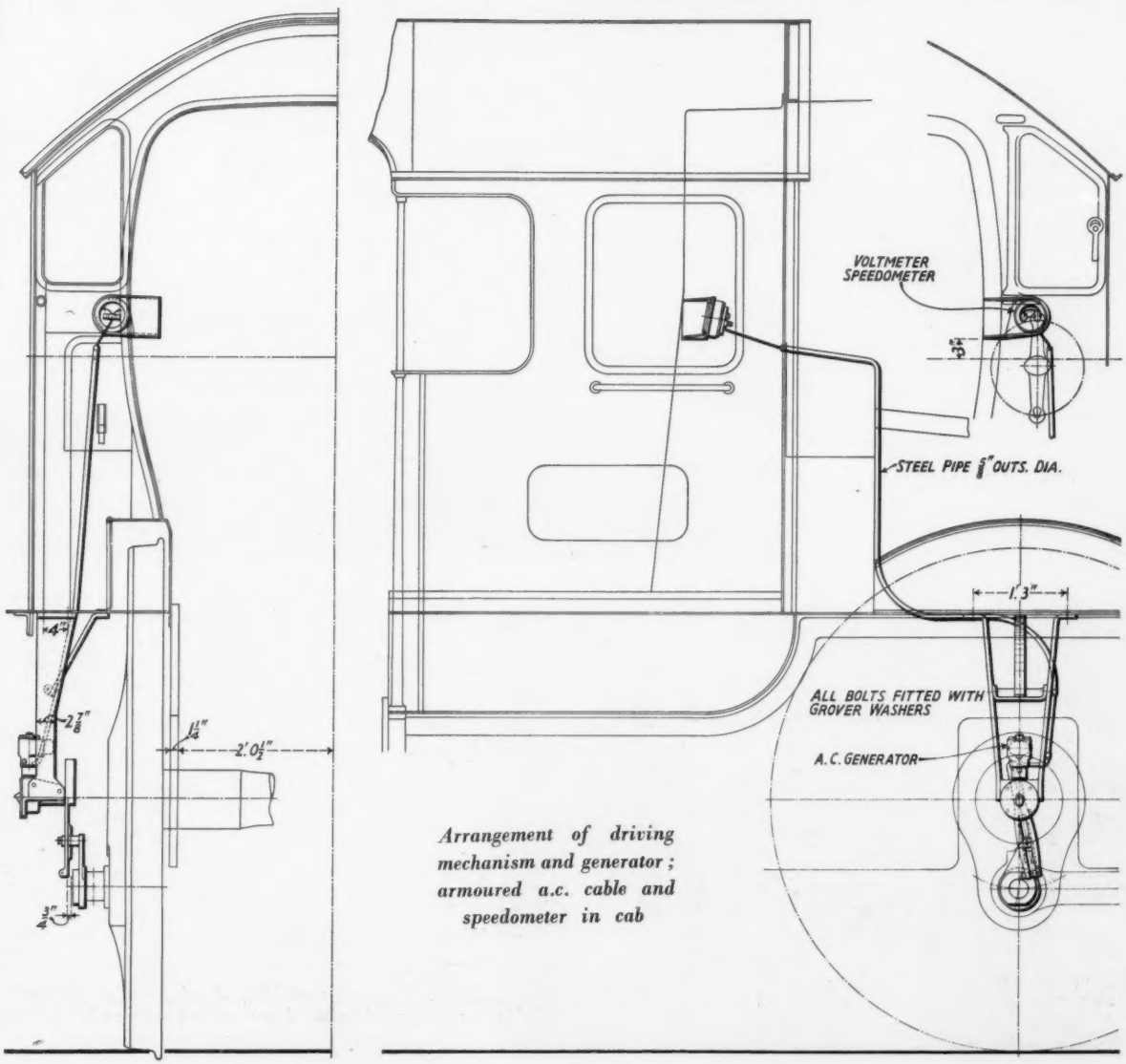


Driving gear and generator

the same centre line as the driving axle by a bracket suspended from the footplate. The slot is long enough to allow for the greatest possible displacement of the driving wheel relative to the footplate bracket. The drive is transmitted through bevel gears to the generator, the armature of which runs on a vertical axis at 2½ times the driving axle speed. An armoured cable conveys the alternating current to the voltmeter in the cab, first passing through a rectifier so that the voltmeter gives a unidirectional reading for both directions of running. The coil in the generator has alternate tappings to permit of fitting to engines with wheels of varying diameters.

It should be observed that the driving arm shown in the illustration, is slotted right through and fitted with a distance piece at the end of the slot. The reason for this is that if the arm were made with a closed end, the speedometer gear would have to be dismantled to remove the coupling rods, whereas with a through slot, all that is necessary is to remove the distance piece, and the driving crank can then be easily unscrewed from the crank-pin and the coupling rods taken away.

The generators and voltmeters are supplied by the British Thomson-Houston Co. Ltd., of Coventry, and the driving mechanism is made at Swindon works.



Arrangement of driving mechanism and generator; armoured a.c. cable and speedometer in cab

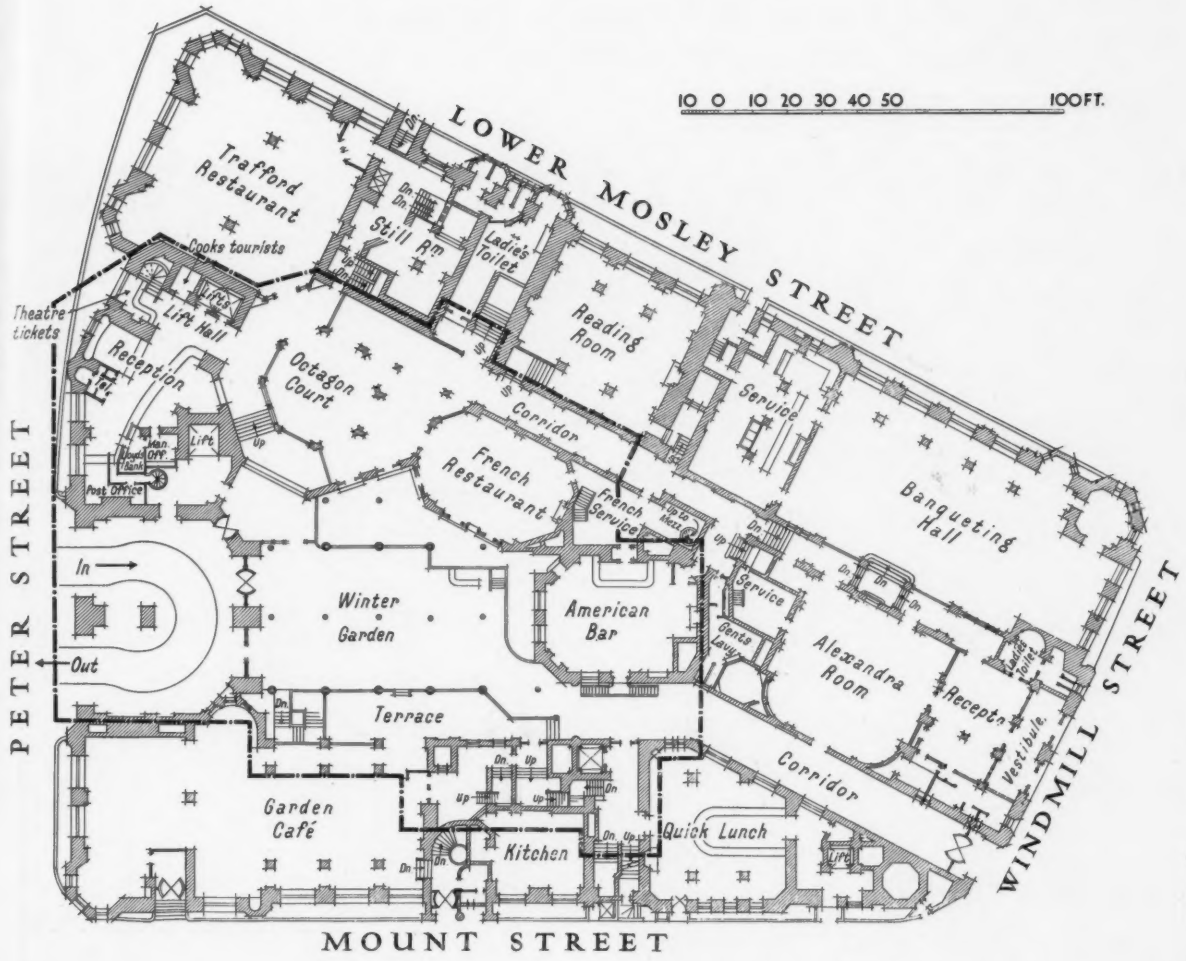
MODERNISATION AT MIDLAND HOTEL, MANCHESTER, L.M.S.R.

New entrance hall, reception office, and lounge on replanned ground floor

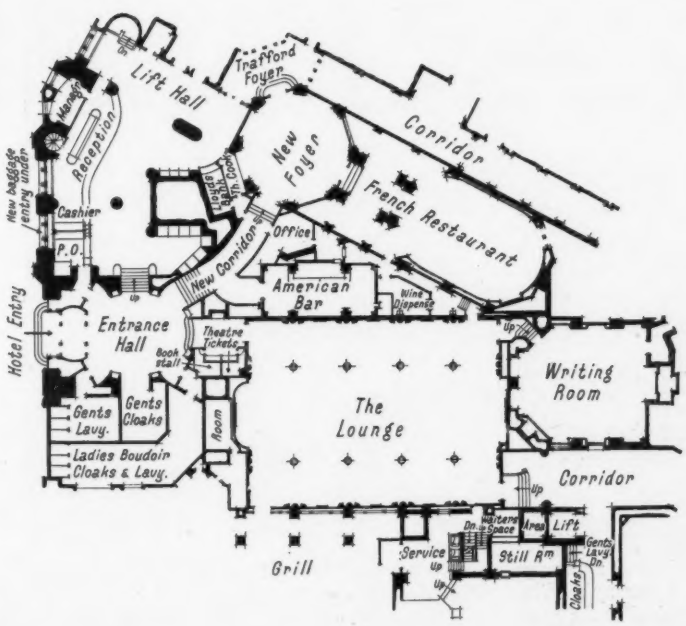
BY the courtesy of Mr. Arthur Towle, Controller of L.M.S.R. Hotel Services, we reproduce two photographs showing the handsome effect achieved by extensive alterations recently carried out to the ground floor of the L.M.S.R. Midland Hotel, Manchester. As will be seen from the plans of the old and the new arrangements, the geography of this floor has been much altered by the provision of a new entrance hall and reception office, a new lounge, an American bar, and a new foyer to the French restaurant. These have involved the disappearance of the former Winter Garden and Octagon Court. The new entrance hall is circular in plan, with a large saucer-shaped dome illuminated by indirect lighting. From the hall, a flight of stairs leads to the reception office, the chief feature of which is a massive central pillar containing in its cap the lighting fittings which illumine the office by reflection from the ceiling. Also communicating directly with the entrance hall is the new lounge, a large rectangular apartment with two rows of columns. At each end is a gilded panel in relief, symbolical of cotton, the chief industry of Manchester. The new foyer of the French restaurant is octagonal, and has open arches on three sides through which the restaurant can be seen. A modern treatment of mirrors is used for the American bar, with acided bands and brilliant cut motifs, representing the days of the week.

Above: A view of the French restaurant, which is now approached from a new octagonal foyer with a glass fountain in the centre and three open arches commanding a view of the restaurant

Left: New entrance hall, showing stairs leading to reception office, the large central pillar of which can be seen at the head of the staircase



Above: Former ground floor plan of the L.M.S.R. Midland Hotel, Manchester

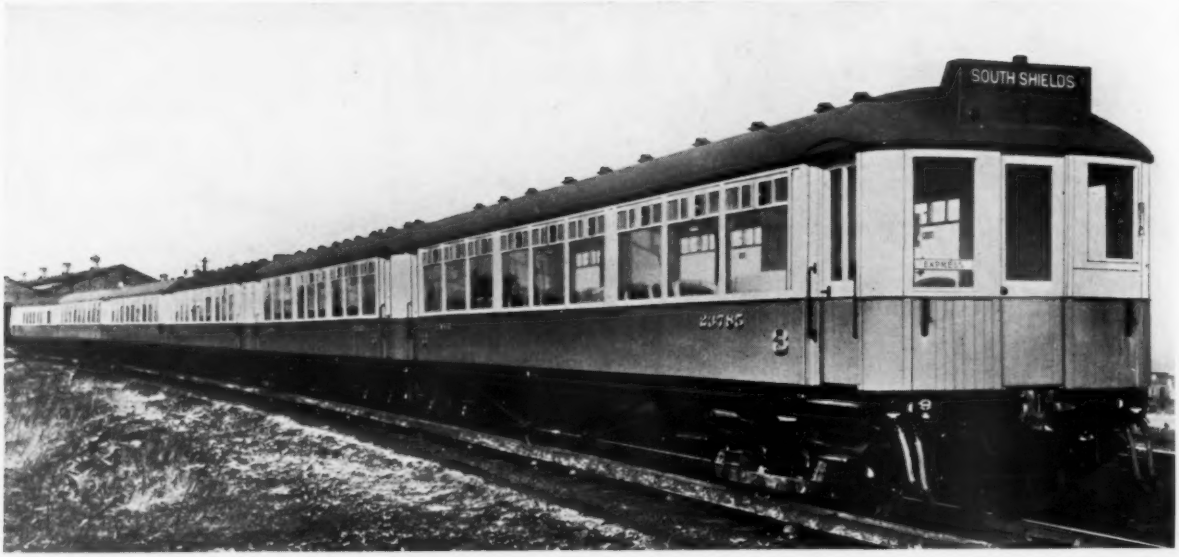


Left: Altered portion of Midland Hotel ground floor. It will be noticed that the Winter Garden has been replaced by the new lounge, while the French restaurant now communicates with a new foyer in place of the Octagon Court formerly giving access to it. The architect was the late Mr. H. J. Connal, F.R.I.B.A., and the decorations were carried out by White, Allom Limited, and H. H. Martyn & Co. Ltd.

MODERNISATION AT MIDLAND HOTEL, MANCHESTER, L.M.S.R.

Tyneside (South Shields) Electrification

(*See account of inaugural ceremony on page* 548)



Reconditioned electric train for the Newcastle-South Shields service

Group at the inaugural ceremony at Newcastle Central station just before the starting of the first train by the Lord Mayor of Newcastle (extreme left). Sir Murrough Wilson, Mr. Jenkin Jones and Mr. Rutter will be recognised in the group

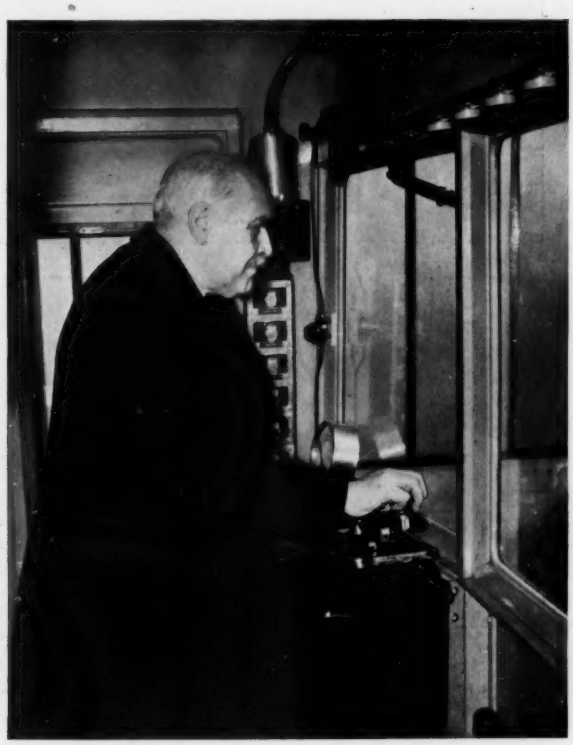
Newcastle] [Evening Chronicle

Merseyside (Wirral) Electrification

(*See account of inaugural ceremony on page* 549)

One of the L.M.S.R. electric trains constructed for the new services

Sir Josiah Stamp, Chairman of the L.M.S.R., speeds the departure of the last steam train on the Wirral Section



Sir Josiah Stamp at the controls of one the new electric trains running on the converted Wirral Section

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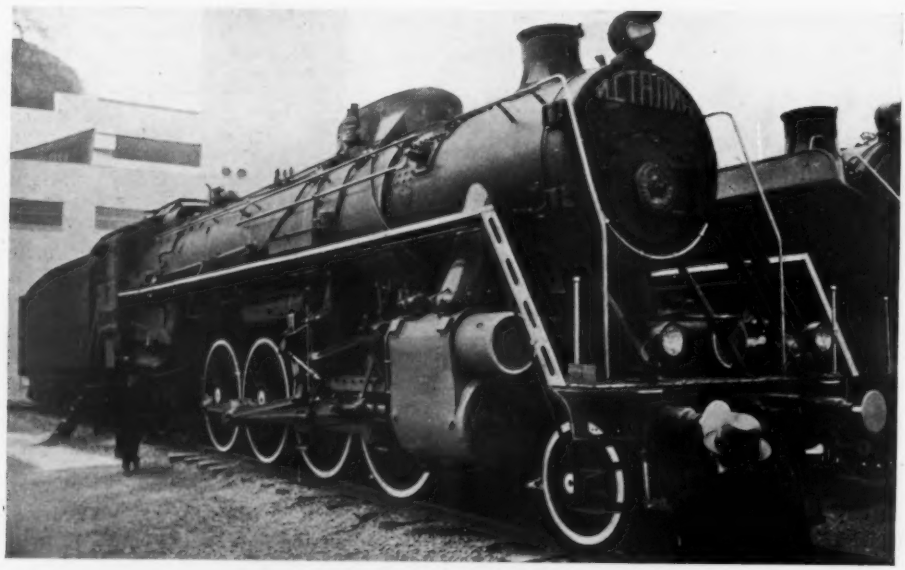
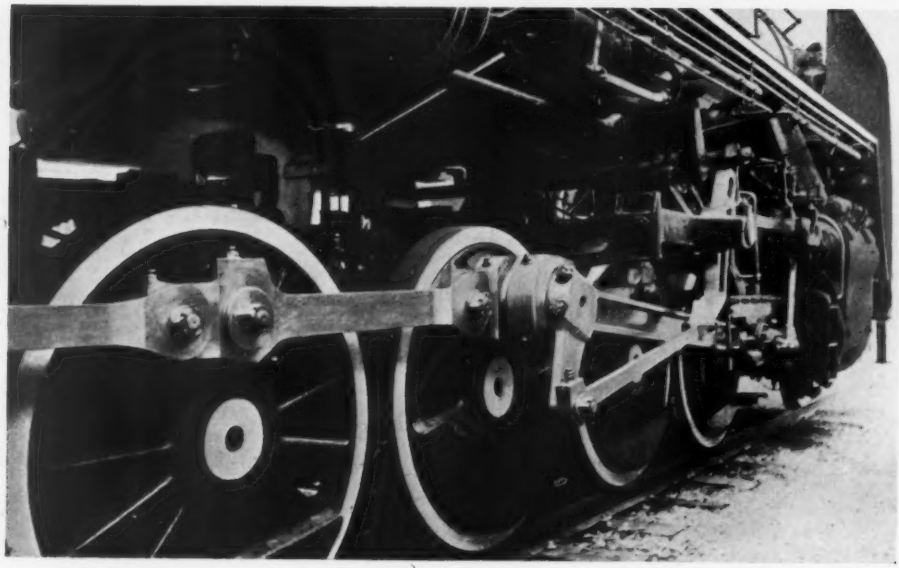
Perspective of the proposed new London Transport station in High Street, Uxbridge



Left : U.S.S.R. new standard "JS" 2-8-4 type locomotive on view at the Paris Exhibition



Left : Coupled wheels and motion of U.S.S.R. "FD" 2-10-0 type locomotive at the Paris Exhibition

(*See page* 519)

RAILWAY NEWS SECTION

PERSONAL

The L.N.E.R. announces that Mr. H. R. Garth has been appointed Assistant to the Engineer (North Eastern Area). Mr. Garth joined the service of the North Eastern Railway at York in 1908 and was appointed Chief Draughtsman in 1923. In 1931 he was appointed an Assistant, and in 1936 Senior Assistant in the New Works Section, and it is from the latter position that he is now promoted.

Mr. A. C. Flower

Chief Engineer, South Indian Railway

Mr. A. C. Flower, V.D., M.I.E.(India), who was confirmed as Chief Engineer, South Indian Railway, on January 1, 1937, was educated at Berkhamsted School, Herts, and University College, London. He joined the South Indian Railway in October, 1908, as a temporary Assistant Engineer on Surveys and Construction, and was confirmed in his appointment on the permanent cadre 2½ years later. After being employed on maintenance and on the Quilon-Trivandrum Railway construction till June, 1915, he was, with the permission of the Home Board, then commissioned in the Indian Army Reserve of Officers, and served with the 2nd Sappers and Miners in Quetta till April, 1916, and in June of the same year proceeded overseas for service in Mesopotamia, where he remained till demobilised in April, 1920. He subsequently returned to duty on the South Indian Railway, and was appointed to act as District Engineer in 1923, being confirmed in this grade in 1925. Mr. Flower was in charge of various districts, including some in an administrative capacity, on construction until 1932, when for eight months prior to proceeding on leave he was Secretary to the Agent. On return from home leave in September, 1933, he was appointed to act as Deputy Chief Engineer, being confirmed in this appointment in April, 1935. He was appointed to act as Chief Engineer in September, 1936, and confirmed in this post on January 1, 1937. Mr. Flower was elected as Chairman of the South India Centre of the Institution of Engineers (India) in November last.

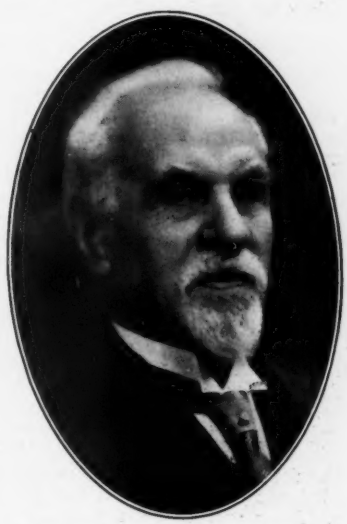
Elliott] *[& Fry*

Mr. F. J. Wymer

Appointed Assistant Continental Superintendent, Southern Railway

Mr. F. J. Wymer, who, as recorded in our issue of March 4, has been appointed Assistant Continental Superintendent, Southern Railway, as from March 31, was educated at Merton Court School, Sidcup, and Eltham College, Mottingham. During the war he enlisted in the Royal Horse Artillery in 1916, subsequently being commissioned in the Royal Garrison Artillery and serving in France and Germany, 1917-19. He was Captain and Adjutant when demobilised. In 1920 Mr. Wymer joined the S.E. & C.R. as probationer and was appointed to the Rolling Stock Section, Superintendent of the Line's Office, in 1923. In the following year he was transferred to the Trains Section of the London (East) Division, and to the Chief Operating Superintendent's Department in 1928. Mr. Wymer was appointed Assistant to the London (Central) Divisional Superintendent in 1930, and Assistant to the Traffic Manager for Special Work in 1931. He remained in the latter position until becoming Divisional Marine Manager, Dover and Folkestone, in 1934, the position he now vacates.

We regret to record the death on March 5 at his residence in Bath of Mr. Alfred Whitaker, late Resident Locomotive, Carriage & Wagon Superintendent of the Somerset & Dorset Joint Railway. Mr. Whitaker was



The late Mr. Alfred Whitaker

Resident Locomotive, Carriage & Wagon Superintendent, Somerset & Dorset Joint Railway, 1889-1911

the eldest son of the late Alderman Samuel Whitaker of Derby, and was born in that town on July 22, 1846. He was educated at the Derby Grammar School and entered the service of the Midland Railway as a pupil of the late Mr. Matthew Kirtley, then Locomotive Superintendent, in October, 1860. After passing through the various shops, and the drawing office, and gaining his footplate experience as a fireman on different classes of trains, he was given charge of the locomotive depôt at Lancaster, and was subsequently appointed to a similar position at Bradford. He was later made Inspector of new locomotives under construction at outside contractors' works. When the Midland Railway was extended to Carlisle in 1875, Mr. Whitaker was given charge of that district, and in 1881 he was appointed District Locomotive Superintendent at Leeds. In 1889 he received the appointment of Resident Locomotive, Carriage and Wagon Superintendent of the Somerset & Dorset Joint Railway, which position

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he held for nearly 22 years, retiring on reaching the age limit in 1911. During his term of office on the Somerset & Dorset he was responsible for the rebuilding of the company's workshops at Highbridge, including the installation of new machinery and plant. He also brought the rolling stock up to date by the introduction of new locomotives and the rebuilding of a number of the old ones, and by building a large number of passenger and goods vehicles in the Highbridge shops. During his railway career, extending over a period of nearly 51 years, he brought out numerous patents in connection with railway equipment. One of the earliest of these were adjustable extension rails for turntables known as "crocodiles," enabling the turning of longer engines than those for which the table was designed. These were in use at many of the Midland sheds until the turntables were replaced by larger ones. A tender water indicator, and an inclined traverser, for moving engines from the side pits to the central road in shops having only one overhead crane, were also amongst his inventions. That which brought his name most prominently before the railway world was his apparatus for exchanging train tablets and tokens on single lines of railway, and which is in use today in various parts of the world. In 1915 Mr. Whitaker was elected to the Board of Directors of the Whitwick Colliery Company, Leicestershire, where his sound mechanical knowledge and inventive ability found ample scope during the complete modernisation of equipment and plant carried out at Whitwick a few years ago. After serving on the board for 23 years he retired only last month. He was also a Director of the Swannington Pumping Company, and held this position at the time of his death, which occurred in his 92nd year. The funeral took place at Beeston Church, Leeds, on March 10. (See also p. 509).

Left to right: Mr. S. W. Smart, Assistant for Train Services to the Superintendent of Operation; Mr. R. M. T. Richards, Assistant Traffic Manager; Mr. C. Grasemann, Public Relations and Advertising Officer

Southern Railway officers leaving London to visit the U.S.A. ***(See paragraph in our issue of March 4)***

We regret to record the death on March 3 of Mr. Thomas Moffet, who retired in April, 1922, from the post of Divisional Land and Estate Agent (Southern) of the former London & North Western Railway. Entering railway service in the Estates Department of the L.N.W.R. at Liverpool, Mr. Moffet was transferred to Euston in 1880. He rose to become Assistant Land Agent of the company, and, in the reorganisation immediately preceding grouping, took charge of the land and estate business of the Euston—Crewe Division with the designation above mentioned.

The Port of London Authority announces that Mr. Asa Binns, M.Inst.C.E., M.I.Mech.E., will retire from his present position as Chief Engineer on May 1, and that Mr. W. P. Shepherd-Barron, M.C., T.D., M.Inst.C.E., has been appointed Chief Engineer from the same date. Mr. Shepherd-Barron is at present Special Assistant to the Chief Engineer, and prior to taking up this appointment last year he was Chief Engineer, Karachi

The L.M.S.R. meeting in progress at Friends House, Euston Road, London, on March 10 ***(see report on page 538).***
Sir Josiah Stamp, Chairman, is seen reading his speech

Port Trust. Mr. F. W. D. Davis, M.Sc., M.Inst.C.E., now Chief Assistant Engineer, has been appointed Deputy Chief Engineer as from May 1.

The authority has recorded its appreciation of the long and valuable services rendered by Mr. Binns, who, in future, will be associated as a consultant with Messrs. Rendel, Palmer & Tritton, of Westminster, and will continue to be at the authority's disposal in the capacity of Consulting Engineer.

The Crown Agents for the Colonies announce that Mr. R. E. Jenkins has been appointed Assistant Accountant, Nigerian Railway.

Mr. Sidney E. Garcke has been appointed Chairman of the Potteries Motor Traction Co. Ltd., succeeding Mr. P. M. Rossdale, who, however, is temporarily retaining his seat on the board.

Mr. J. D. C. Couper, C.B.E., M.Inst.C.E., M.I.Mech.E., at present in practice as Messrs. Couper & Ker, 4, Dean's Yard, Westminster, S.W.1, is joining Messrs. Livesey & Henderson, consulting engineers, as a partner as from March 31. The style of the firm will remain unchanged.

Mr. E. H. H. Stenning has been appointed London Manager of Jarrow Tube Works Limited, with offices at 410, Abbey House, Victoria Street, Westminster, S.W.1. Mr. Stenning is the second son of Col. H. A. Stenning, late of The Superheater Co. Ltd., and has been for the past nine years with the Talbot-Stead Tube Co. Ltd.

Herr C. C. Hedegaard Cristensen has been appointed to succeed Herr Munck, whose retirement from the post of Chief Mechanical Engineer, Danish State Railways, was announced in our issue of February 18. Herr Cristensen, who is 44, was for many years with the Copenhagen Shipbuilding Yard, and Burmeister & Wain; he entered the State Railways service in 1933, being principally engaged in workshop organisation.

We regret to record the death in Stockholm on February 25, from heart failure, of Törje August Törjeson, Chief of the Maintenance of Way Division of the Swedish State Railways. Born in Malmö on September 9, 1876, Mr. Törjeson graduated from a technical college in 1895 and entered the service of the Swedish State Railways in 1898. He worked up through subsidiary posts such as Chief of the Yard Department until in 1933 he was made Chief of the Maintenance of Way Division. On several occasions Mr. Törjeson left the service of the State Railways to fill special duties, such as in 1915 when he was sent to North America on a railway mission. He was also active in such related transport projects as the development of the harbour at Trelleborg, in southern Sweden; and was acting Professor in Railroad Construction at the Stockholm Technical University.

Great Southern Directorate

The postal ballot for re-election of directors of the Great Southern Railways, Eire, resulted in the following being returned:—

Major Hugh A. Henry, Deputy Governor of the Bank of Ireland (13,919 votes).

Mr. P. J. Brady, Solicitor, ex-M.P. (11,730 votes).

Unsuccessful candidates were Mr. Christopher D. Evans, a former Director (4,775 votes); and Mr. Robert Treacy (1,410 votes).

Sr. Acevedo, a former Argentine Minister of Finance, has been appointed Chairman of the Buenos Aires Transport Board, now being formed to co-ordinate transport services in the city.

The late Sir Albert William Wyon, senior partner of Messrs. Price, Waterhouse and Company, whose death on December 1 last year was recorded in our issue of December 10, left personal estate of £277,992 (£261,872 net).

Indian Railway Staff Changes

Mr. L. N. Flatt, V.D., Chief Mechanical Engineer, N.W.R., has been granted six months' leave as from November 26.

Mr. H. N. Parker has been appointed to officiate as Deputy Traffic Manager (Transportation), E.B.R., as from December 20 last.

Mr. C. F. White has been appointed to officiate as Chief Mechanical Engineer, G.I.P.R., as from November 9 last. He has been succeeded as Deputy Chief Mechanical Engineer (Locomotive) by Mr. J. N. Compton.

Mr. H. D. Furley, Chief Operating Superintendent, N.W.R., was permitted to retire from Government service on January 6.

Mr. H. J. Allinson, officiating Chief Electrical Engineer, N.W.R., has been nominated as a member of the Central Electricity Board *vice* Mr. S. Simpson.

Mr. J. C. Gibson, Deputy Chief Mechanical Engineer, E.I.R., has been granted 9½ months' leave combined with deputation in Europe, as from February 28.

Mr. H. G. Scotter has been appointed to officiate as Deputy Chief Mechanical Engineer, Running, E.B.R., as from January 3.

Mr. H. M. Baikie has been appointed to officiate as Deputy Chief Engineer, Brahmaputra Bridge Project, E.B.R., as from January 4.

Mr. J. D. B. Osborn, officiating Divisional Superintendent, E.B.R., has been granted eight months' leave as from March 18.

On return from leave Mr. H. J. Allinson was appointed to officiate as Chief Electrical Engineer, N.W.R., with effect from January 10.

Mr. E. L. Cook has been appointed to succeed Mr. J. A. Pretty as Personal Secretary to the Chairman of Commissioners, Victorian Government Railways. Mr. Cook joined the railways in 1920, and was appointed to the District Superintendent's Office, Ballarat. Five years later he was attached to the personal staff of Mr. M. J. Canny, then General Superintendent of Transportation and now Commissioner. Mr. Cook has subsequently been transferred temporarily to other Government departments, and has held the positions of Secretary to the Chairman of the Development and Migration Commission; Secretary to the Minister for Public Works; and Secretary of the Mofor Omnibus Advisory Committee. Mr. Pretty has been appointed Senior Relieving Officer in the Secretary's Branch.

Forthcoming Events

Mar. 18 (*Fri.*).—Institute of Transport (East Midlands), at Guildhall, Nottingham, 7 p.m. "Maintenance and Operation of an Omnibus and Trolleybus Fleet," by Mr. W. Williamson.

Institute of Transport (Manchester—Liverpool), at Central Library, Manchester, 6.30 p.m. "Modern Road Problems," by Mr. E. Leeming.

Mar. 19 (*Sat.*).—L.N.E.R. Musical Society, at Town Hall, Leeds, 7.15 p.m. Concert.

Mar. 20 (*Sun.*).—L.N.E.R. Musical Society, at City Hall, Hull, 2.30 p.m. Concert.

Mar. 21 (*Mon.*).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. Annual General Meeting.

Institute of Transport (Scottish), at Grosvenor Restaurant, Glasgow, 7.15 p.m. "Town Planning," by Mr. G. Alexander.

Mar. 22 (*Tues.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "The Problem of Seat Reservation," by Mr. W. Bradbury.

L.N.E.R. Musical Society, at Hamilton Hall, Liverpool Street Hotel, London, E.C.2, 8 p.m. Concert.

L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 6.45 p.m. Annual General Meeting.

Permanent Way Institution (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Protection and Repair of Railway Structures by the ''Gunite' Process," by Messrs. J. Campbell and A. Jackson.

Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Preservation of Timber," by Mr. R. Chamberlain.

Mar. 23 (*Wed.*).—Institution of Railway Signal Engineers, at Inst. of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. "High Speed Trains and their Effect on Signalling," by Mr. F. Egginton.

Permanent Way Institution (London), at Underground Railway's Dining Club, Pelham Street, S.W.7, 7 p.m. "Photography in Relation to Railway Engineering," by Mr. C. Thompson.

Railway Convalescent Homes, at Wharncliffe Rooms, Hotel Great Central, Marylebone, London, N.W.1, 6.15 for 6.45 p.m. Banquet.

Mar. 24 (*Thurs.*).—Institute of Welding (Leeds), at Griffin Hotel, 7.30 p.m. "Automatic Carbon Arc Welding," by Mr. P. Roberts.

Model Railway Club at St. John's School, Kirkman Place, Tottenham Court Road, W. 1, 7.30 p.m. "A Continental Railway Trip," by Mr. W. A. Willox.

Southern Railway (London), Lecture and Debating Society, at Chapter House, St. Thomas Street, S.E.1, 5.45 p.m. "Charing Cross Road and Rail Bridge Scheme," by Mr. W. Cochrane.

Mar. 25 (*Fri.*).—Institution of Locomotive Engineers (London), at Trocadero Restaurant, Piccadilly Circus, W.1, 6.30 for 7 p.m. Annual Dinner.

LONDON MIDLAND & SCOTTISH RAILWAY COMPANY

Increased passenger receipts—More work at lower cost—Locomotive and goods operating economies—Patronage of Coronation Scot—Stationary and mobile locomotive tests—Wirral line electrification—Air route regularity—Current year brings traffic increases

The fifteenth annual general meeting of the London Midland & Scottish Railway Company was held at Friends House, Euston Road, London, N.W.1, on March 10, Sir Josiah Charles Stamp, G.C.B., G.B.E., Chairman of the company, presiding.

The Assistant Secretary (Mr. G. Royde Smith) read the notice convening the meeting.

The Chairman said: Ladies and Gentlemen, I now lay on the table the report and accounts for the past year, and as they have been in your hands for some days, I presume you will as usual take them as read.

It is with very great sorrow I have to refer to the fact that during the past year we have lost by death three members of our board. On August 14 Sir Arthur Rose died, after a short illness, at the early age of 62. He was a man of wide experience, high capabilities, and sound judgment. He was also an indefatigable worker for the company, and represented us on MacBraynes and the Scottish Motor Traction Companies, and his work for the country, especially as Commissioner for Special areas in Scotland, is well known; indeed—and it is a sad thought—had he spared himself more in public service he might still have been with us.

You will remember that a year ago we reported that Mr. Ismay was away on sick leave. In June last he resigned and he passed on several months later. There thus came to an end a long family connection with the old London & North Western, and the London Midland & Scottish Railway Companies, and we have suffered a great loss especially in our shipping interests.

Another long family connection, this time with the Midland and London Midland & Scottish Railway Companies, ended by the death on November 23 of Mr. Douglas Vickers. He had been a Director for thirty-five years, and his industrial and engineering experience and his friendship and counsel will be greatly missed. He also rendered great service as a British Representative on the Permanent Commission of the International Railway Congress Association.

Board Changes

As you will have seen from the report, Mr. Murray, unable to travel regularly to London owing to ill-health, resigned his seat at the board, but I am glad to say we still have the benefit of his experience and advice on the Scottish Committee in Glasgow. His place has been taken here by Sir Robert Greig, who joined our Scottish Committee on February 22, 1934, and has a great knowledge of agricultural and Scottish interests.

Viscount Runciman, who you will remember resigned from the board in 1931 on his appointment as President of the Board of Trade, has been re-elected a Director, and the company is fortunate in again having the benefit of his wide experience and specialised knowledge. We have also been fortunate in the accession to the board of Sir Robert Burrows, who has extensive knowledge of the large industrial and commercial interests of Lancashire.

You will share our satisfaction that His Majesty in the Coronation Honours conferred a Knighthood on Sir William Wood, our Vice-President for Finance and Service Departments, who has rendered fine service to British railway interests generally. I regret to say our Chief Accountant, Mr. Taylor, has retired though ill-health. He has been succeeded by his assistant, Mr. George Morton.

Results of the Year

I should like to mention before coming to a review of the 1937 results, that in conjunction with the other railway companies we have, with the consent of the Minister of Transport, omitted shillings and pence from our full published accounts. For the fifth year in succession we have an improvement in net revenue. The various results are given in detail in the summary before you and I need not repeat the details of the railway receipts, but it is interesting to record the fluctuations of the last nine years:—

	Railway receipts	Per cent. of 1929
	£	
1929	73,195,000	100
1930	68,241,000	93·2
1931	63,223,000	86·4
1932	58,507,000	79·9
1933	58,185,000	79·5
1934	60,572,000	82·8
1935	61,658,000	84·2
1936	64,463,000	88·1
1937	67,234,000	91·9

and the improvement has been maintained in 1938, the results for the first eight weeks of the year showing an increase of £317,000 over 1937, which is a little better than our anticipations.

Passengers Highest since 1929

Since the low water mark in the railway receipts of 1933 the recovery has been fairly generally spread over the various classes of traffic, but it is interesting to compare 1937 with 1929. The decreases against 1929 are:—

	£	Per cent.
Passengers	1,385,000	6·4
Parcels, &c.	344,000	4·9
Merchandise (Class 7 and upwards)	3,155,000	14·4
Merchandise (Classes 1 to 6) ...	314,000	4·6
Coal	548,000	3·8
Live stock	236,000	28·8
Miscellaneous ... *increase*	11,000	1·7
	£5,961,000	8·1

The passenger receipts are best since 1929, and although 6·4 per cent. below 1929, they show a steady improvement each year since 1933, which is continuing in 1938. We carried 461 million passengers in 1929, and last year were only 1,700,000 short of that figure, but in passenger miles there was an increase from 7,672 million miles to 8,104 millions, or, say, 6 per cent.

The decline in general merchandise (Class 7 and upwards) is marked, and it is here that we suffer most from the effects of road competition. While we had this severe loss in receipts the work done as measured by ton-miles was 99·9 per cent. of the 1929 level, and the reduction in revenue was mainly due to the combined effects of less short distance traffic and reduced rates. The former factor can be readily appreciated when I add that the average length of haul in the eight years increased from 70·4 to 76·6 miles, although 1937 itself showed a reduction of one mile—the first year which has shown a reduction since the L.M.S.R. was formed.

The receipts from coal and the low grade traffics covered by the term "Classes 1 to 6" have recovered well and will, I hope, reach the 1929 level in 1938. The live stock figures are very bad and reflect the Irish difficulties.

Railway Expenditure

I have compared the traffic receipts last year with 1929, and without giving you each intervening year the corresponding reduction in railway expenditure is 6¼ per cent., and you will bear in mind the large proportion of railway expenditure which is unaffected by the volume of traffic. We are thus doing substantially more actual work than in 1929 at considerably less working cost.

Compared with 1936 the working expenditure increased by £2,387,000, and the main cause is the large increase in prices

of materials and rates of wages I mentioned a year ago. I told you that we could then see three-quarters of a million additional for price advances, but the increase has been much more severe. The growth in railway expenditure is made up of:—

	£
Maintenance	941,000
Operating expenses	1,352,000
Other	94,000
	£2,387,000

As in 1936, the increase in maintenance of way and works and rolling stock is due to the growth in prices of labour and materials, the renewal provisions alone increasing by £493,000. The increase in operating expenses, while due partly to the growth in traffic, is largely a reflection of increased rates of wages and prices of coal; we were fortunately aided in the last two months of the year by considerably better operating conditions than in 1936, when we were heavily handicapped by unfavourable weather.

Smaller Increase in Net Receipts

The railway net receipts total £13,636,000, an increase of £385,000 over the previous year, and are disappointing compared with the successive increases of roundly £1,000,000 in each of the three previous years, but the chief reason was beyond our control and the costs capable of control were reduced. As regards the other businesses I need say little. The net results from road transport, steamers and docks again show the highest figures in any year, the docks being aided (at the expense of steamers) by increased charging powers which Parliament granted us last year. Canals have gone a little worse owing to special damages due to floods, while hotels and air services I refer to later.

I have previously explained to you the reactions of increased merchandise receipts on the collection and delivery account, and this year the result is an increased loss of £55,000; whilst receipts increased by £102,000, the expenditure, mainly for the reasons I have explained in relation to other accounts, increased by £157,000. The net result compared with 1929 is, however, an improvement of £280,000 and, with slightly higher receipts than in 1929, expenditure has been reduced by £260,000. The net result from all businesses is an increase of £306,000, and miscellaneous items add another £2,000, which reflects on the one hand improvements in joint lines and in capital account investments, and on the other hand reductions in interest items.

The net revenue of £14,356,000 or £308,000 more than in 1936 is regarded by some as small in relation to the growth of gross receipts, but the severe increase in prices is, as I have shown, the chief cause, and I must warn you that the full impact of this rise was not felt in 1937. On the other hand the benefit of increased charging powers granted to us, which I am explaining later, was felt in three months only of 1937.

Turning to the balance sheet, you will observe that the loan from the Railway Finance Corporation, which I have already fully explained to you and is a receipt of a capital nature, for technical reasons not credited to capital account, is increased by nearly £2,000,000, savings bank deposits have increased by £1,220,000 and reserves of various descriptions by £570,000. On the last item I should add that the renewal provisions for all businesses set aside during the year out of revenue expenditure in accordance with our usual practice, amount to £5,630,000, an increase of £606,000, mainly due to increased prices. A critic has suggested that we are unduly conservative in this policy, but my reply is that we do not live from " hand to mouth " and our provisions are very carefully considered on their merits and are those appropriate to our responsibilities to the public and to the proprietors.

Return of 9 per cent. on Capital

Our capital outlay has been mentioned by another critic. I have told you before, and repeat, that none is authorised without the fullest justification from the net revenue aspect. This year the largest part of the total of £2,250,000 is £1,650,000 for rolling stock. We expand or contract our stock according to probable requirements, such as for the heavy freight traffic in December last (the " peak " since the great war) and the unique " peak " in passenger traffic early last year due to the Coronation of King George VI. At amalgamation our capital expenditure stood at £437,000,000. In 1929 it had grown to £448,500,000, and in the eight years since then it has grown by £8,200,000 to £456,700,000. Of that £8,200,000, £4,000,000 is due to investments in road transport undertakings but, to hark back to our net revenue, this £4,000,000 gave us a direct return in 1937 of £360,000 or 9 per cent., and I need not repeat what I explained before regarding the excellent return from our modernisation of equipment generally, and particularly our rolling stock.

The investments, other than those in capital account, amount to £28,250,000, an addition of nearly £3,000,000, a reflection largely of the reduction of the rates and rate relief suspense account as the overpayments are being recovered. We have still nearly £1,500,000 to recover, but it is coming in rapidly. Stocks of stores have risen by £1,300,000, or 20 per cent., mainly again owing to prices, but partly to building up reserves of certain supplies owing to difficulties we experienced in obtaining deliveries at certain times during last year.

The outstanding traffic accounts show an increase of £415,000 arising from the increased traffic. I explained last year that our net revenue results for 1936 were the best since 1929 and that we hoped to maintain and improve upon them in 1937. We have actually done so and the additional 5s. per cent. dividend proposed on the ordinary stock will, we hope, be improved upon in 1938.

Rates and Charges

Since 1929 the Railway Rates Tribunal have been holding their annual reviews of railway charges in accordance with the Railways Act, 1921. As you know, an important function of the tribunal is to fix rates, fares and charges which will, so far as practicable, with efficient working, yield to us a prescribed annual net revenue known as the " standard revenue," and they are required when making their periodical reviews to make general modifications of the charges, where necessary, to enable such standard revenue to be earned. I need hardly remind you that if on any such review net revenue exceeds the standard, 80 per cent. of such excess is to be devoted to reducing the charges.

Now it is common knowledge that the railway companies have not yet been able to earn their standard revenues. The deficiency in our case was at its maximum—£10,600,000—in 1932, and the deficiency in 1936 was still £6,500,000. The tribunal have throughout adopted the practice of inviting the suggestions of the railway companies as to the possibility of meeting the deficiencies. At each annual review from 1929 to 1936 the companies informed the tribunal that, in their view, an increase of charges would not be likely to yield an increase of net revenue. On each such review the tribunal found that the undertakings of the companies had been conducted with efficency and economy, but having regard to the companies' submissions on charges no increases were authorised. There has, however, been a marked improvement in the trade of the country generally since 1935, which justified a more optimistic view of the future, and after careful consideration the companies came to the conclusion early last year that a moderate increase in charges would improve their net revenues materially, without prejudicing the continuance of the favourable trend in trade and industry. Accordingly, they submitted proposals for increases in charges, with the object of assisting the tribunal in carrying out the duty imposed on them, although they recognised that this increase would still leave them short of their standard revenues.

The Five per cent. Increase

The railway companies appreciated that different descriptions of traffic would respond in different degrees to an increase in charges, but they felt that there were strong reasons against any differentiation in the application of the increase. They were of opinon that an increase of 5 per cent., applied

generally, would yield some increase of revenue, though possibly not to the full extent of 5 per cent., with a corresponding addition to the net revenue. There was therefore no justification for leaving any description of traffic untouched by the increase, and the railway companies felt that any discrimination in favour of any particular traffics would be inequitable and would be resented by those interested in other traffics. In those circumstances the proposals laid before the tribunal were for a general increase of 5 per cent. or thereabouts to apply to all charges subject to the jurisdiction of the tribunal, the estimated addition to net revenue in a full year being, in our case, £2,200,000.

The hearing before the tribunal occupied 16 days, and at the conclusion they decided to modify the standard and exceptional charges substantially as proposed. This decision took effect from October 1, 1937, but it did not apply to fares in respect of intra-London suburban passenger services, as these are governed by the London Passenger Transport Act, 1933.

We have not yet had a full year's experience of the effect of the tribunal's decision, but the partial experience so far appears to justify the estimate we put forward. Although not its objective, this addition to our revenue will offset to a considerable extent the increased cost of labour and materials which we have felt severely.

Increased Prices

This increase in costs is partly due to the increased wages bill, which has followed from the wages agreements I will refer to later, and to the effect of the cost of living on wages rates of certain grades which move with that index. While this increase is due very largely to a restoration of reductions in the period of extreme depression, the level of wages costs is higher now for various grades than before the so-called cuts and the addition to us in a full year over the costs of 1936 is £1,830,000. The other factor is the marked increase in prices of coal, iron, steel, timber, provender and in fact nearly all our purchases. Taking them as a whole the present addition to our costs over 1936 through increased material prices, after allowing for certain recent reductions from the highest levels, is at the rate of £2,230,000 in a full year.

While these two factors will together add about £4,000,000 per annum to the costs of 1936, the effect on revenue is a little less because of capital elements and so forth, and in any event a large part of the impact will not be felt until 1938/39 owing to the use of earlier purchases. The effect on the revenue expenditure for 1937 was as mentioned in the directors' report, an addition of £1,875,000.

Accelerated Train Services

Further acceleration of our passenger services during 1937 covered 361 express trains, and last year we had 63 start-to-stop runs at an average speed of 60 m.p.h. or over, covering an aggregate of 6,227 miles daily. The outstanding feature of the year was the inauguration of the 6½-hr. schedules between Euston and Glasgow with The Coronation Scot on July 5, which involve an average running speed of 62 m.p.h. in each direction. New streamlined locomotives have been provided for these trains with coaching stock of the most modern design, and 36,000 passengers travelled by the trains during the period from July 5 to December 31.

Owing to the general increase in passenger travel, it is difficult to estimate exactly to what extent the introduction of these trains has actually added to our receipts, but the loadings have been remarkably good, and a comparison of the carryings by our alternative services shows that a considerable measure of additional business has been obtained.

Preparatory to the introduction of The Coronation Scot special trials were made from Euston to Crewe and back on Tuesday, June 29. The run to Crewe (158 miles) was completed in 2 hr. 10 min., *i.e.*, at an average throughout speed of 72·92 m.p.h. Between Whitmore and Crewe the train attained an average speed of 108 m.p.h. over a distance of five miles; for two of those miles an average speed of 112·5 m.p.h. was achieved rising to a momentary maximum of 114 m.p.h., thereby creating a British maximum speed record for steam trains. The return journey from Crewe to Euston was accomplished in 1 hr. 59 min. at an average speed of 79·66 m.p.h.

Midland Improvements

The express train services on the Midland Division main lines between London, Leeds and Bradford, and London and Manchester have been remodelled, and six trains now run non-stop from St. Pancras to Nottingham or *vice versa*, covering the 123·49 miles at an average speed of 60·24 m.p.h., and 10 trains make a non-stop run from St. Pancras to Leicester or *vice versa* at an average speed of 60·05 m.p.h. The journey time of six trains in each direction between St. Pancras and Manchester has been cut by an average of 22 minutes. A new non-stop express from St. Pancras to Sheffield and back performs the journey of 158·51 miles in 2 hr. 52 min. each way; and although higher speeds than formerly are not practicable north of Trent and Nottingham owing to colliery subsidences, the services between London, Sheffield, Leeds and Bradford will benefit substantially by the quicker running in the South.

More Fitted Freight Trains

During 1937 the number of fitted freight trains, *i.e.*, trains composed wholly or partially of vehicles fitted with the automatic brake, has been further increased, and there are now 333 fitted trains compared with 172 at the end of 1929, an increase of 93·60 per cent.

The various directions in which modernisation has been taking place are showing themselves in our operating results, which are throughout better than in 1929, the year most appropriate for comparisons of traffic results. Thus the greater power of our locomotive force shows itself in a reduction of double heading or assisting mileage from 100 to 85 for passenger trains and 100 to 45 for freight trains. Similarly shunting hours per 100 train miles have been reduced by 13 per cent. for passenger train and 3 per cent. for freight. The more economical use of locomotives is shown by the miles per weekday in use, which increased 24 per cent., and coal consumption per mile is down by 2 per cent., despite the higher speeds and other amenities which draw upon engine power.

Decreased Locomotive Casualties

During 1937 the number of locomotive casualties showed a decrease of 12·20 per cent., compared with 1936, whilst the engine mileage rose by 5,045,000 miles. As a consequence the miles per casualty increased by 16·83 per cent. Comparing 1937 with 1934 the mileage per casualty has risen 78·31 per cent.

Special mention may be made of the fact that during the four-weekly period ended May 15, the total number of locomotive casualties for the line was the lowest figure on record for a four-weekly period. This achievement is particularly gratifying when it is remembered that during this period the traffic for the Association and the Rugby Cup final ties, the Coronation, and the outwards Whitsuntide traffic was handled. I should perhaps add that by a locomotive casualty we mean a failure of a locomotive in service due to a mechanical defect.

Locomotive Testing

Up to the present our facilities for testing locomotives have been of a simple character consisting of coupling a dynamometer car to the engine to be tested on an ordinary booked train. With this method it is not, however, possible to isolate the effect of individual alterations and improvements, and in this respect our testing equipment is behind that available to stationary engines. In collaboration with the L.N.E.R. this deficiency is now to be removed by the construction of a testing station at Rugby. In this the locomotive runs upon rollers inside a closed building, and the essential feature of this method of testing is that the conditions under which the engine is run can be kept constant. There are so many factors that affect the performance of a locomotive that in order to arrive at the best results each one must be explored separately and the effect of any one of these factors can only be accurately obtained when all the other conditions are kept constant. It is thus possible

to run the locomotives under what amount to laboratory conditions, and these are ideal for research into questions of fundamental design.

At the same time there are other aspects of testing which can be better carried out on the road, such as investigation into resistances and the scientific correlation of engine power with train schedules. For this purpose an additional testing apparatus, known as a mobile test plant, is being provided. This consists of three vehicles fitted up electrically to act as a brake on the locomotive, so that the speed can be kept constant under all variations of wind and gradient. The work of the stationary and mobile test plants will be complementary, and in conjunction with a new dynamometer car, replacing our existing 25 years old car, will supply a fund of data from which locomotive design can proceed on more scientific lines with the assurance that improvement towards greater efficiency can be achieved more quickly and with greater confidence than in the past.

Modernised Motive Power Depots

Continuing the policy of the modernisation of motive power depots, 10 further schemes have been completed during 1937, making a total of 47 to date. The greater mobility of engines at the motive power depots which have been modernised has, in conjunction with other efforts directed towards economical use of engine power, assisted in meeting the demands for engines due to additional traffics, an increase of 2·25 per cent. in steam engine mileage in 1937 compared with 1936 having been met by increasing the number of locomotives in service by only 1·08 per cent. Considerable progress is being made in bringing up to date such facilities as hostels and other amenities which cater for the comfort and welfare of the staff.

Up-to-Date Goods Facilities

The investigations into the modernisation of goods terminal work to facilitate the handling of traffic and reduce operating costs which were begun in 1933 are progressing steadily. Thirty-eight schemes involving structural alterations and with gross savings of £18,500 per annum have been completed, and fourteen costing £440,000 with £61,950 per annum gross savings are in hand. One hundred and thirty schemes not involving structural alterations have been completed with savings estimated at £50,000 per annum. With this experience schemes for several of the larger goods depots, where further economies are possible, are in hand.

The benefits accruing from these facilities with their lessening of manual effort are reflected in improved working. The average time occupied in handling 100 tons of traffic, loaded or unloaded by the company, in 1937 was 119 man-hours, compared with 124 in 1929, although the number of consignments per ton increased by 15 per cent.

We spend five million pounds annually in shunting and are examining the lay-out and methods at our motive power depots, goods stations and traffic marshalling yards closely with a view to increasing their operating efficiency. Close contact has been maintained with developments on other railways at home and abroad in the mechanisation of certain large traffic yards with rail brakes and centralised point operation, but until recently there has not been any financial justification for re-constructing a yard on the L.M.S.R. sufficiently large to warrant the introduction of rail brake working.

Improvements at Toton

Toton marshalling yard (near Trent station), is the " key " yard for the Midland Division coal traffic. The down side deals mainly with empty wagons returning to the collieries, and in the winter anything up to 5,000 wagons per day pass over the single hump line in that yard. Operating difficulties have been experienced there during the winter months, and the problem which presented many special difficulties has been under review for some time, but we have now adopted the scheme which we consider the most suitable. The down yard is to be re-modelled and will incorporate the rail brake or retarder system of wagon braking, together with other improvements which are essential to that method of working, such as centralised point operating, modern signalling and lighting, and loudspeaker equipment. The work will cost nearly £60,000 and will be carried out in stages during the summer months when the traffic is lightest. Owing to the present delay in obtaining delivery of certain materials, and the difficulty in carrying out the constructional work without interference with traffic operations, the scheme will not be completed until the summer of 1939.

Apart from the direct benefits to be derived from the adoption of this scheme, it will serve to give further experience of value in the mechanisation of other important marshalling yards.

One Hundred Shock-Absorbing Wagons

The experiments on shock-absorbing wagons have been successful. A wagon has been finally tested and approved which embodies the principle of interposing a shock-absorbing mechanism between the undercarriage and the body. Its practical effect is to absorb any shock which occurs to the chassis in shunting or other operations, before the body and its contents are reached. The tests have shown that for speeds up to about 6 m.p.h. the special springs absorb the impact on the chassis whilst over that speed they absorb a proportionate amount, thus reducing materially the actual shock which is encountered by the goods inside the vehicle. We are building 100 of these new open 12-ton general service wagons, and when delivery is made the new vehicles will be employed to convey traffics known to be susceptible to breakage in transit.

In experimenting in this direction many classes of damageable traffic have been safely conveyed, especially sanitary tube and fireclay products generally. Sheet glass in crates and earthenware and china have also been dealt with successfully. For instance, the chinaware sold by a multiple retailer (Woolworth) at many branches all over London was carried for a period of four weeks from Longton to St. Pancras under close observation. The results are interesting, inasmuch as the amount of the claims on packages conveyed in the new shock-absorbing vehicles shows a reduction of 66 per cent. upon claims on packages conveyed in an earlier experimental type of shock-absorbing wagons for the same work.

Research

The activities of our Research Department continue to expand both in diversity and importance. This is due partly to a growth in mutual confidence between the research staff and the officers of the other departments, and partly to the improved facilities for scientific investigations provided by our new laboratory at Derby. This building is the outward and visible sign of our reseach policy, in the shaping of which we continue to owe so much to the members of the Advisory Committee on Scientific Research. One of the original members of this committee was the late Sir Herbert Jackson, whose wide knowledge and sympathetic interest in the work of individuals were invaluable to the department in its early days. In his memory we have struck a medal to be given annually with the " Herbert Jackson " prize to the member of our research staff who submits the best written account of the investigations carried out by him during the year. I may say that the quality of the papers recently submitted for the prize is good evidence both of the high standard and wide range of the scientific work of this department and of its value in helping to solve practical problems of the railway.

Rail Joint Investigation

One of the most important problems with which we are now dealing is that of the rail joint. However fascinating the rhythm of the rail joint may be as a subject for correspondence in *The Times*, it is a source of weakness in the permanent way and an important contributory cause of noise and vibration in the railway carriage. We are therefore engaged, in conjunction with Professor Inglis at Cambridge, on a fundamental research into the behaviour of rail joints in order to determine the direction in which changes from the traditional design should proceed.

Towards the end of the year the Government of India paid us the compliment of inviting our paint technologist to visit

India to report on the painting practice of the Indian railways. He has just completed his tour, and I have received a highly appreciative acknowledgment of his services in this connection.

Three years ago I told you what our general policy is regarding electrification and although some of the factors involved may have altered a little, there has been no change in the main position since then. I must refer to the subject again, however, because I have seen the incorrect statement made in responsible quarters that we had asked for public assistance towards the cost of undertaking electrification schemes. This must be due to a misunderstanding of a statement I made, on a suggestion of further electrification, that insofar as electrification is required to secure certain national values distinct from, or over and above the value to the railways, that was a matter for public funds and not railway shareholders' funds.

Exactly the same comments apply to other statements that we have received material assistance from the Government, I presume through the Railway Finance Corporation. These arrangements were mutual. We on our part agreed to undertake certain specified works which would not otherwise have then be entered upon, but which became justified with cheaper money obtainable by a Treasury guaranteed loan, in turn covered by an obligation to issue L.M.S.R. debenture stock as collateral security. The Government advantage lay in the additional employment created by the placing of orders in the industrial areas.

Shortly our standpoint is, first, that works shall not be undertaken by us at the stockholders' expense for non-railway purposes and, secondly, that we have neither asked for nor received any public assistance for anything done or proposed to be done for railway purposes.

Electrification of Wirral Line

The electrification of the passenger services on the Wirral Section, one of the works carried out under the provisions of the Government guaranteed loan arrangement, was put in hand to join up the section of the lines on the Wirral Peninsula to the Mersey Railway, so that passenger trains can run to and from Liverpool Central and West Kirby and New Brighton without the change that has hitherto been necessary at Birkenhead Park. The line will be opened for electric service on Monday next.

This will speed up the service considerably and offer a convenient and comfortable route in and out of Liverpool, and in many instances should enable workers in Liverpool to get home to their mid-day meal. During the rush hours a ten-minute service will be run between West Kirby and Liverpool and also between New Brighton and Liverpool, and in the off-peak hours there will also be an improved service. In order that the same trains may run over both the Mersey Railway and the Wirral Section, the Wirral line has been electrified on the 600-volt third rail system. By arrangement with the Mersey Railway the L.M.S.R. trains will run between West Kirby and Liverpool Central and the Mersey Company's trains will run between New Brighton and Liverpool Central.

Power is taken from the Liverpool Corporation by duplicate cables through the Mersey Railway tunnel to the main sub-station at Birkenhead North which is the principal point of control. From there 11,000-volt lines are taken to the other five sub-stations on the system. Many new technical features have been introduced on the system, such as in the design of the third rail, in welded bonding and in air-operated doors on the rolling stock. The stock is of a light type and the equipments have been designed and laid out specially for easy and economical maintenance. One interesting feature is that all the outer sub-stations are controlled from a main sub-station at Birkenhead North, there being no sub-station operators at the other sub-stations.

Hotels

The business in the hotels during 1937 was on much the same level as in the previous year, although the number of visitors was affected in the tourist centres by the fall in foreign currencies just before the summer holiday period. The gross revenue from refreshment rooms and dining cars shows improvement on the previous year, although in common with other catering establishments there has been an increase in all working costs. The alterations at the Midland Hotel, Manchester, have been completed with satisfactory results to the business.

The Queen's Hotel, Leeds, as you have no doubt seen in the press, was opened on November 12 by the Earl of Harewood in the presence of H.R.H. The Princess Royal, and met with great appreciation both from the City of Leeds and elsewhere. This hotel, which is the latest contribution in Europe to hotel construction, has been fitted with every modern convenience, and is the first hotel in this country to be built with air-conditioning throughout. The patronage of the hotel has so far been very encouraging.

The ground floor and public rooms at the Caledonian Hotel, Edinburgh, are being modernised on the lines of the alterations at Manchester, and this should bring them up to the high standard of our principal hotels. The older of the two golf courses at Turnberry is being remodelled in accordance with the latest golf practice, and both these courses will be amongst the best in the United Kingdom and on a par with our famous King's Course at Gleneagles Hotel.

Westminster Offices

In September last, Fielden House, a new block of offices of modern type, was opened in Great College Street, Westminster. This accommodates the Railway Companies' Association and the Great Western Railway Company as tenants, and has also enabled the L.M.S.R. staff working in this area to be concentrated in one building instead of occupying three separate sets of offices as previously. Apart from the desirable concentration of the work connected with parliamentary matters the Railway Rates Tribunal and other statutory bodies, this arrangement has enabled us to dispose, upon favourable terms, of the premises previously occupied at 35, Parliament Street, following upon the sale of the Great George Street offices. In this way not only has the benefit of greatly improved office accommodation been obtained, but there has been a reduction in the annual costs incurred by the company.

You will remember the great interest that was aroused by the visit of the Royal Scot to the United States and Canada in 1933, its exhibition in the Century of Progress at Chicago and its run to the Pacific Coast. It was undoubtedly a most effective means of stimulating interest in travel to Great Britain from the direct and indirect results of which this company has gained considerably. It is not too much to say that it created a fresh interest in railway travel in that great motor-minded continent as not a few visitors entered a train for the first time, and it had an influence too on some of the present developments of rolling stock design in America.

Coronation Scot to Visit U.S.A.

In our opinion the results obtained were so valuable that next year we are sending the Coronation Scot to take part in the World's Fair in New York and to make a tour of the United States, visiting as far as possible districts that were not traversed in 1933, and finishing with a tour in Canada after the exhibition. In doing this we feel that we shall sustain the great reputation of the London Midland and Scottish Railway in the Northern American Continent.

The national propaganda of certain European nations to attract the American tourist to their country is more extensive and intensive than ever. On the revival of tourist business from America, the L.M.S.R., with the other British and Irish railways, as represented by their joint organisation, the Associated British and Irish Railways, Inc., New York, felt it necessary to improve their office location in New York, and in May last moved to new ground-floor offices which are in the famous Rockefeller Centre, where most of the important travel interests now have their headquarters, and are of very good publicity value. As Chairman of the joint company I presided over the inaugural functions, at which there was a representative and influential attendance. The difference between a first-floor and a ground-floor access is best exemplified by the com-

parative number of callers at the old and new premises which rose from 678 visitors in June, 1936, at 551, Fifth Avenue, first floor, to 1,686 visitors in June, 1937, at the new offices.

The enormous area of the U.S.A. has long been one of the handicaps to proper representation of British and Irish rail and travel interests in America, it being physically impossible to maintain contact with Agents in all States from one office situated in New York. Sub-offices of the Associated British and Irish Railways, Inc., have therefore been opened in Los Angeles for the Pacific Coast States and in Chicago for the Middle West, under the supervision of the General Traffic Manager, New York. These offices issue tickets for rail and associated bus travel in Great Britain and Ireland, and plan and arrange inclusive tours in conjunction with American travel organisations. They distribute publicity in its various forms, arrange lectures and travel talks, and keep close contact by visits with over 400 travel agents and organisers throughout the U.S.A. and Canada.

American Visitors to Britain

In the depression of 1933 the total of American visitors to this country dropped to 30,000, but some indication of the increasing importance to this country of the American tourist business can be gained from the fact that in the year 1937, they reached 103,000, a gain of 21 per cent. on 1936. These activites of the railway companies include the operation of a travel bureau on the *Queen Mary*. This is a complete travel organisation, representing, and effecting bookings for all forms of travel, not only in Great Britain and Ireland, but in Europe and America. From the maiden voyage in May, 1936, up to the end of November last—a total of 33 round trips—the business done amounted to over £31,000, of which £22,000 was revenue to the British and Irish railways. Similar arrangements are being made on the *Queen Elizabeth* which is now being built.

Air Transport

In my speech last year I referred to the publication of the report of the Maybury Committee on the development of civil aviation in the United Kingdom, and in March, 1937, the Government announced their acceptance of their recommendations. These include a co-ordinated system of routes based on the Manchester-Liverpool area, to be worked by a company or combination of companies under licence. I may say that the network proposed corresponds closely with that operated by Railway Air Services during the summer months, of which this company provides an important part. It is suggested that other routes should also be worked under licence.

The committee, while recognising the limitations of air transport in this country, were hopeful as to the future of internal civil aviation developed in an orderly manner, and expressed the opinion that co-ordination between surface transport and aviation will become increasingly important, instancing the advantages derived from the close association of the railways with R.A.S. and allied companies. As regards the suggestion that competitive forms of transport have entered the field of commercial aviation in order to delay its development, they say, "Any such attempt is perhaps unlikely, and certainly we see no signs of it." During the past year we have continued our policy of testing the demand for internal air transport in this country, by direct operation, through the medium of Railway Air Services Limited and in association with other air operating companies.

Air Mail Route Results

Our London—Belfast—Glasgow trunk service has continued without interruption since August, 1934, and the growth of traffic on this route has been continuous though slow; and during the summer of 1937 we operated an additional afternoon service in both directions. The Post Office mail contract which has been in operation for the years 1936 and 1937 has been renewed for the year 1938. The regularity of the service has been most satisfactory, and notwithstanding difficult operating conditions during the winter months, practically 100 per cent. regularity has been achieved, and I am pleased to say the operations during 1937 were entirely free from accident.

It has been our policy with regard to air transport to co-operate with our surface interests and so far as practicable with other air operators. For instance, our air service to the Isle of Man was operated jointly with the Isle of Man Steam Packet Company. Last September arrangements were concluded for a fusion of all the interests concerned in this service in a single company, the Isle of Man Air Service, in which our partners are the Isle of Man Steam Packet Company and Olley Air Service Limited. Under this scheme the financial prospects of this service will be greatly improved.

We hope to effect further co-ordination with other air operators as and when opportunity offers, and our efforts will continue to be directed to the provision of air transport within our area where the public demand for it is likely to be sufficiently regular and expansive to justify it, to the point of ultimate profitability, and to the co-ordination of air with rail and sea transport. But it requires patience.

Staff College at Derby

Last year I outlined the reasons that led to our decision to open a staff college at Derby, and the ideas and—I think I may say—the ideals of staff training that will inspire its work. The foundation stone was laid on September 22 last, and it is hoped to have the building completed and ready to receive the first-course students by May of this year. The design, which is the work of Mr. W. H. Hamlyn, our own architect, is Georgian in style, slightly modernised to suit the purpose of the building. Particular attention has been paid to its setting, and the college will stand in carefully laid-out grounds with facilities for all kinds of outdoor recreation.

The interior arrangements include a cinema lecture theatre, a model railway and accommodation for approximately 50 resident students, each of whom will be given a full-time course of training for periods of two weeks and upwards. Good progress has been made in planning the courses and in preparing textbooks, which will incorporate the best railway practice on the operating and commercial sides, for hitherto comparatively little attention has been paid in this respect to the non-engineering work of the railway. The recording of such knowledge will make it available to every member of our staff, giving to each the chance of equipping himself for promotion to the highest posts.

In February last year I mentioned that the Railway Staff National Tribunal had from August, 1936, reduced the 2½ per cent. deduction to 1¼ per cent. In April last the three railway trade unions submitted claims for the restoration of the remaining 1¼ per cent. deduction and the conditions of service which were modified at the time the percentage deduction was made in 1931. In addition they asked for certain improvements in conditions of service.

Cost of Wages Restoration

The claims of the unions were discussed under the standing scheme of negotiating machinery, and, as agreement was not reached, they were submitted by the three unions, to the Railway Staff National Tribunal on July 1, 1937. The tribunal, under the chairmanship of Sir Arthur Salter, issued a decision under which the 1¼ per cent. deduction ceased to apply as from August 16, 1937. The tribunal also conceded certain improvements in other directions, including increases to the lower paid staff. The cessation of the 1¼ per cent. deduction was also applied by agreement to the railway shopmen, and in the settlement covering this section of our staff, made at the National Railway Shopmen's Council, it was agreed to grant a week's annual holiday with pay to all shopmen commencing with 1938.

The total cost to the company of giving effect to these decisions, including the application of the findings to other staff similarly affected, is £1,215,000 per annum. Further increases in the labour cost have followed from the rise in the cost of living. The rates of pay of certain staff included in the various National Agreements affecting clerical and conciliation grades are subject to an increase or decrease of 1s.

per week on a rise or fall of 5 full points in the cost of living index figure compiled by the Ministry of Labour. The recent additional expenditure to the company on this account is approximately £285,000 per annum.

The average number of staff employed during 1937 increased as compared with 1936 by 5,705 (or 2½ per cent.), but at December 31 our staff was 7,056 more (or 3·1 per cent.) than at the same date in 1936. Consequent upon the increases I have mentioned in labour costs, including those in August, 1936, and the employment of additional staff to meet the increase in volume of business, our labour bill for 1937 was £1,890,000 greater than in 1936.

Transport Advisory Council

You will remember that a Transport Advisory Council was appointed composed of 29 representatives of the transport industry, including three for the railways; and from time to time the Minister has referred various questions to it. It was also the intention that it should examine, on its own initiative, the broad issues of transport problems. Accordingly, three years ago it began an investigation of service and rates in relation to goods traffic borne by rail, canal, road and coastwise shipping, and decided that the first part of the investigation should be into the road transport section.

On the question of charges the council reports that all forms of transport should, where practicable, be rate controlled, and points out that while the railways are controlled by an elaborate rate structure, canals are to a very limited extent subject to maximum rates and coastwise shipping and road hauliers are entirely free from rate control. They considered what should be done in regard to road transport and reached two conclusions, namely (1) the internal organisation must be regarded as an essential preliminary to further progress; and (2) the stabilisation of wages, working conditions and rates within the industry require to be dealt with before serious progress can be made in its relation to other forms of transport.

The special committee appointed to examine the present position as regards wages has recommended that the wages and conditions of service should be subject to new regulative machinery which would ensure that there would be uniformity of practice throughout the country and that minimum wages would be enforced. The Transport Advisory Council recommended that effect should be given to these proposals by the legislature at the earliest possible moment and that it is desirable to fix some reasonable time limit within which the machinery should become effective, observing that " the settlement of this question will be a great step forward; indeed, no real co-ordination as between road and rail would be possible without it."

Road Rates Proposals

On the rates side the council recommend that as a first step opportunity should be afforded for the road hauliers to build up a structure of charges for their own industry in relation solely to factors affecting road transport, without necessarily relating them to charges in other forms of transport. It was not suggested that road charges should be quoted on some cast-iron system, but rather that the structure as a whole should be elastic, and be capable of adjustment by simple and quick procedure. It was agreed, however, that there must be suitable machinery for enforcement of agreed road rates as between road operators themselves; also to set up statutory area rates committees; to appoint area rates officers who would approve or modify schedule of agreed rates put before them by the Rates Committee in their area; and appoint a Road Rates Tribunal for the whole country consisting of a representative of the road industry, a representative of traders and an independent chairman.

The railway companies did not ask that there should be any form of compulsory agreement as to rates, but preferred that any agreements should be entirely voluntary, and the road members concurred in this view, agreements being terminable at reasonably short notice by either party to lapse until replaced by a new agreement. The council suggested that conferences should be held as early as practicable. The Minister of Transport has announced that the Government accept the broad principles of the report and propose to introduce legislation accordingly.

Outlook for 1938

Comparing the two months already elapsed with 1937 there has been, ignoring the 5 per cent. rate increase, a decline in the revenue from general merchandise, but it has been made good by an increase in minerals, coal and passengers. Although in many particular industries 1938 would have difficulty in maintaining the 1937 results, the general prospect over our system is that trade as a whole may be just about the same level as in 1937—perhaps a little above it. If this proves to be the case, the net financial results will then reflect the increase in rates and fares for nine months, less the increase in wages for seven, and also less any general increase in the cost of our supplies. Economies in working continue to be made in many directions, and although road competition remains severe the position of our undertaking compares very favourably with that of railways generally throughout the world.

Stockholders' Remarks

Councillor J. Wilson (Accrington) congratulated the Chairman on his speech and particularly on the engineering data contained in it. He also expressed pleasure at the successful manner in which the increased traffics had been handled during the year, but he hardly thought that this momentary increase warranted the increase in wages and the holidays with pay. These holidays with pay should only prevail when there was a profit to distribute a dividend for the ordinary stockholder. The reason why they had seen their trustee stock become a speculation and a Stock Exchange gamble was because the Government had failed completely to pass the Bill declaring the road competitors of the railways to be common carriers. Another reason was the Railway Rates Tribunal inaugurated by the Government when the railways were a monopoly. It was now an obsolete body, which cost this company this year £4,228 and the L.N.E.R. £3,505. On the subject of preventable accidents he would point out that today there were small transmitters and receivers, costing less than an ordinary radio receiving set used at home, which could be installed in every signal box, engine, and guard's van, and at all times the signalman would be in direct communication with both the engine driver and the guard. He thanked the Chairman for the consideration given in the Northern Division to the company opening its own booking offices. This had been the means of saving 5 per cent. for the stockholders and many thousands of pounds, and he hoped that it would receive consideration over the entire line. He wished to express his great appreciation of the services of the Secretary, Mr. Glynne Roberts, who was not present that morning. Mr. Glynne Roberts was always able to reply personally to any stockholder who sent a letter containing constructive material.

Mr. E. C. McAdam was unable to agree with the bright statement in regard to the acounts which the Chairman appeared to have put before the stockholders. The increase in receipts on the L.M.S.R. was £3,138,000, of which the company retained £318,000, equal to just under 10 per cent. The L.N.E.R. had an increase of £2,286,000, and retained £832,000, equal to 35 per cent. Then the Great Western Railway had £1,716,000 and retained £572,000 or 33⅓ per cent. That was the amount of extra profit on the increased services. In addition, the L.M.S.R. reserves were below the level of those on the L.N.E.R., and were only a trifle above those of the Great Western Railway. Nothing had been put to reserve account on account of hotels, and the net result of that account was really increased receipts of £74,000 and increased expenses of £180,000. He would suggest that a committee be formed to look into everything brought up before the board in the way of expenditure. Money should not be spent on all these extravagant experiments with new engines and coaches. It was not the general public that wanted these high speeds.

Mr. Watson (Liverpool) thought that a thorough and impartial investigation would result in much wastage being stopped. He alleged that there was complete lack of supervision and control in all offices where overtime was allowed.

Mr. Z. Burkhill (Crewe) brought up the question of the adoption of a mechanical lubricator which he contended had proved itself efficient and economical.

Sir Charles Stuart-Williams considered that the results which the Chairman had elaborated were extremely satisfactory, but there were some points regarding the net revenue result which were not very clear. For the first half of the year the net revenue increase was £310,000, whereas in the second half there was a decrease of £2,000. So far as he understood that was not due to any expected expenditure on renewals and replacements. The renewals showed a remarkable reduction of over £3,000,000 on the year, but that had not in any way redounded to the benefit of the shareholders. Although in the previous year something over £3,000,000 was credited to renewals account, nothing whatever was taken from the renewals account this year, and the actual effect on the 1937 accounts was that expenditure on renewals was increased by something like two-thirds of a million. As to hotels, it was sometimes suggested that they were rather expensive for a man who was not too well off. As an instance a friend of his found himself and his wife the only residents in the Turnberry hotel. It had been suggested to him (although he had no definite knowledge) that co-operation with the L.N.E.R. regarding goods traffic had not been carried quite so far as it might have been.

Mr. W. G. Perry (Birmingham) recommended economy in the use of materials, and asked that the cost of fire bricks and the cost of building brick arches should be looked into. Light engine running was increasing, and a good deal of that might be avoided. On the subject of supervision he maintained that it was not only a matter of creating new posts, but it was the expenses that went with them. He asked whether anything would be done towards the amalgamation of the four big railway companies. That appeared to him to be their only salvation, as there were so many hostile forces at work outside. As to the staff college at Derby, which was quite a good thing, he asked for an assurance that it would not have eventually to be closed down.

Mr. R. P. Richards contended that in the carriage stock the company was carrying a dead weight per passenger hauled greatly in excess of what it used to carry.

Mr. Warwick Rogers maintained that the cartage rebates allowed on collected and delivered traffic were too low and led to loss of traffic.

Mrs. C. M. C. Smith spoke with appreciation of the courtesy always extended to her by the railway staff, but asked the Chairman to bear in mind when this huge expenditure was being made the countless army of women ordinary shareholders, who had very little to live upon. She again advocated the appointment of a woman director. There must be a great many ways in which a woman could bring about savings.

Mr. G. F. Parkes asked whether it would be possible for the Derby staff college to be thrown open to everybody, and for the working at Euston of the film unit to be used on the four companies.

Mr. Richard Chamberlain thought that more supervision should be carried out locally. In the manufacture of sleepers he advocated the use of a particular pine, which was the finest in the world for the purpose.

Mr. E. R. G. Bardsley asked whether any decision had been arrived at regarding the closing of the railway between Settle and Carlisle and diverting the through traffic by the junction at Ingleton, where it joined the West Coast main line. By closing the Settle to Carlisle line the company would be relieved of the maintenance of over 50 miles of railway which were very difficult to work and passed to a great extent through almost uninhabited country. A large portion of its local traffic was within reach of the West Coast line.

Mr. J. G. Biggs advocated the adoption of monetary reform.

Mr. W. J. Hutchinson was emphatic that the privilege tickets granted to the employees should be withdrawn, at least in some cases. Every employee had the right to a free pass every year, and members of his family were allowed to travel with a privilege ticket at the rate of about ½d. a mile. The condition of Inverness station was a standing disgrace to the company.

Chairman's Reply

The Chairman: Mr. Wilson, of Accrington, made a reference to holidays with pay being confined to the years of ordinary dividends. I am afraid that it is a much larger question than that, and I cannot go into it at this meeting, but I will have a discussion with him privately if he likes to see me. Whatever you may feel about the Railway Rates Tribunal, I think they do their difficult task very successfully indeed; but you cannot talk about parting with this institution without making a political question of it, because they are appointed by statute. With regard to loud speakers and their use, we are in fact experimenting with all the different types that we know of, making the best use that we can of them that public facilities will allow. I am sure that our officers will give the fullest consideration to the success or the results of booking offices in the Northern Division, and if the innovation is desirable in the way of extension I am quite sure you will hear more of it. I shall be perfectly willing to put on record his kind comments about our Secretary, who is unfortunately absent today with a slight attack of laryngitis.

Coming now to Mr. McAdam, we had last year a bigger increase than all the other railways put together. If you make a comparison with 1929, you will find that the figures are above those for the other railways put together. The trading results for the hotels are shown in the accounts, and I do not want to go into fine questions of book-keeping, but if Mr. McAdam will come to our office we will go into them, and show him that they are not only in accordance with statutory requirements by the Ministry of Transport, but they will also stand criticism from a commercial point of view. He tells us that we are all wrong in improving the speed of the railway trains. That does not accord with the criticisms that we heard a few years ago, when we were told we had to make some improvements in speed. The best test is this, as to whether people travel in these fast trains. I have already given you the figures to show that they do. Those of us who are advancing in years do not like advancing speed, but it is quite clear that a very large section of the public demand it, and it has been a very important feature, not only in this country but abroad, in keeping people attracted to railway travel.

Our profits have not been going down; they have gone up each year since 1932. I am not sure whether it was Mr. McAdam's point that the cost of engine running was greater. I am very much surprised at that statement. If you study the various speeches I have made, you will find I have continued hopes of economies being secured by our larger engines and by our modernisation policy in the goods and other engines. That is one of the economies we have made.

Now Mr. Watson read a long statement about various alleged abuses, and I thought that many of them were very close to being grave reflections upon the conduct of the fine and eager and honest body of workers on our railway. I know there are many defects in organisation, and we are always glad to have them pointed out to us if we do not see them for ourselves. If you direct our attention to them, we try to put them right. But these were general statements made about the general character of a large number of our employees. I can only say that if he will give us specific instances of those things that he thinks are worth investigating, we will go into them and deal with them absolutely on their merits. With regard to his statement about our salaries bill, I am rather astounded, because I have given you figures to show that there has been a very material decrease in the total salaries bill, despite the fact that we are doing more work since 1929.

Then Mr. Burkhill, of Crewe, referred to the lubricator which he has an interest in. I will only say that this is an expert question for our engineers, to try it out in connection with others.

Sir Charles Stuart-Williams has referred, with many very kindly comments, to his appreciation of what we have done to get our results. He has referred to Turnberry on the question of these hotels. I am sure our Hotel Controller

and his staff have tested out all the various means of keeping a full load of visitors, so to speak, in these hotels as long as they can; but I do know that just prior to this period we were beseiged with applications and had twice as many as we could possibly grant. On the question of goods traffic co-operation and joint working, if Sir Charles will give us concrete instances of other cases where he thinks that joint working can be put in where we have not done it, we shall be very pleased to look at it. Every place on the line is looked at from that point of view of pooling, and we have had them give us satisfactory results. We are always ready to receive any specific instances for inquiry. Sometimes you can see something that we cannot.

With regard to the criticism (I did not understand it to be from Sir Charles himself; he was passing on the comment) that in a particular year we charged more against our gross revenue as expenses to put into our renewal fund than we actually spent on renewals, that is the whole essence of it, and the method is that we charge it year by year, and we do not jump about in an arbitrary fashion, charging a great deal in one year and a very little in another year. In this particular year we did happen to put a little more into reserve than we had taken out. But last year I explained the heavy withdrawal of nearly £3,000,000 from reserves, excess compared with the amount put into them. May I say that now, and for the last nine years, we have spent more out of the renewal fund than we have put in, and in three of those years less.

Mr. Perry, of Birmingham, referred to the Chief Commercial Manager having a fine system into which a great deal of effort is put at the top, but somebody unknown makes holes at the bottom and makes it all run out. Mr. Ashton Davies here has very keen vision, and I will ask him to look out for these holes, and particularly to consult the speaker.

On the question of light engine running and general carelessness in operation on the part of people who are " dressed in a little brief authority," I think the figures I have given you show how the operating results have been improving steadily since 1929, in many cases in a most astonishing way, and I think they can show it cannot be very widespread. With a total staff numbering many thousands, there may be here and there somebody you can point to who does like a little brief authority. If his attention is brought to it first of all, and if it is not corrected, I am quite sure that his authority can be made a little briefer. But you must not expect in a great organisation like this that you can never find anything anywhere that is not perfect. It is only with the very fine spirit of the majority and close supervision that these remarkable results have been brought about. I should hate it to go forth from this meeting to our eager and active staff that the shareholders did not appreciate what they were doing, because it is not fair to a fine body of men.

I have been asked by Mr. Perry about further amalgamation. I have said before that most of the advantages that could be gained from amalgamation of a purely commercial character have been secured of recent years under pooling schemes and co-operative work of various kinds. The others, which he may regard as political advantages, I am not dealing with here, and I am saying that there is not much to be got from the point of view of the amalgamation of the four companies in the way of further financial benefit. The four companies work very well together, and there would be very little advantage, if any, if amalgamation (on the merits of which I will not comment) were brought about. The benefits of pooling direct are now between £300,000 and £400,000 a year.

With regard to the staff college, we are not thinking what we shall do with it on closing it, but we are quite confident that it will fill a very important need at the present time, so that over a widely scattered system the best information can become available quickly to all. What that means is this. You have probably a million men, and if one is only £1 more efficient than he was before then, then you have got a fraction of an ordinary dividend.

I was surprised to hear Mr. Richards's comments—they were almost, to me, engineering heresies—about our dead-weight. The dead-weight per passenger hauled has been steadily reduced since the amalgamation, and I have explained in previous years how that has been done. If you will look at last year's speech you will see I dealt at some length with rolling stock reduction, and I gave the reduction in weight from 20 to 6 lb. per seat. The weight that we still haul per passenger is a constant surprise to all our foreign visitors.

Mr. Warwick Rogers had some very important observations on the possible effect or the division of the total rate as between the railway and the road, and suggested that we divide 8s. instead of into 7 and 1, into 5 and 3, and that important and substantial advantages to the railway might follow. He then went into other questions about the inland millers, and I was not quite clear how far his observations went into the matter; but I will also go into that. These questions of the division of the total rate must always be a little arbitrary. If you divided it up in a different way you would have less profit on the joint operation of the railways. You must look at the two things together. That is the real essence of the problem, and I will have those problems looked into by our experts to see whether in any particular instance some different rebate would get more traffic to the railways and less to the roads. I should be sorry to have a rebate which would encourage, not so much the question of haul as haul by other people's vehicles to the station, instead of our own country delivery and collection and delivery services. But it is an important point, and I will have it gone into.

Then Mrs. Smith, of Chester, does a great deal of useful work in talking on the lines that she has indicated, is a splendid advocate of many things, but I am sure she is not a very good advocate of the case that women are not getting younger! (Laughter.) We take note of what she has said. Somebody has referred to the question of comparative subscriptions and donations. Nearly all the figures that we have relate to the Hospital Fund, and examined from that point of view it bears quite a different complexion, I may say, from that which was suggested.

Mr. Chamberlain, of Crewe, had remarks on supervision and the benefits of decentralisation. It is always a difficult question to say exactly which is more profitable, but it is always being looked at, and from a much wider point of view than can possibly appear to anybody looking at the particular case. He referred also to sleepers and the different types of wood. We are always experimenting, but I would ask him to remember that the utility of a sleeper is a combination of many things: its total life, cost of maintenance, treatment, and its price taken together; and you can afford a higher priced sleeper if it will give you greater service, but that must be studied.

Mr. Bardsley was telling us about the advantage that would accrue to the company if we closed a certain line between Settle and Carlisle; it would relieve maintenance, and he apparently was a strong advocate of closing it. If he will give us details of his remarks I will have them very carefully looked into. If I may say so, practically every inch of the line is periodically inspected, but it is quite possible that his observations on the spot will give us further details that we can work into our calculations.

Mr. Hutchinson refers to the privileges of the staff and their free tickets. The free tickets are a condition of service and are used in all the wage discussions. With regard to the privilege rate, it is three times greater than he suggested, and I am quite sure, from our observations on privilege tickets, that the company do not lose by them. On the contrary, they make money. With regard to building construction, we will bear his wise observations in mind.

The resolution regarding the adoption of the report and accounts was put to the meeting and declared carried unanimously.

The Chairman then moved: " That final dividends for the year ended December 31 last be hereby declared (less income tax) as follows:—£2 per cent. upon the four per cent. guaranteed stock, £2 per cent. upon the four per cent. preference stock, £2 10s. per cent. upon the five per cent. redeemable preference stock (1955), £2 per cent. upon the four per cent.

preference stock (1923), and a dividend for the year of £1 10s. per cent. on the ordinary stock."

The Deputy Chairman (Mr. E. B. Fielden) seconded the resolution which was carried unanimously.

On the motion of the Chairman, which was duly seconded, Sir Alan Garrett Anderson, G.B.E. M.P., Sir Robert Abraham Burrows, Sir Ralph George Campbell Glyn, Bt., M.C., D.L., M.P., Sir Robert Blyth Greig, M.C., LL.D., D.Sc., Mr. Charles Ker, D.L., LL.D., C.A., General the Hon. Sir Herbert Alexander Lawrence, G.C.B., D.C.L., LL.D., Sir Thomas Royden, Bt., C.H., and the Rt. Hon. Viscount Runciman of Doxford, P.C., D.C.L., LL.D., were unanimously re-elected directors of the company.

On the motion of Mr. E. C. McAdam, seconded by Councillor Wilson, Sir Nicholas Edwin Waterhouse, K.B.E., was re-elected an auditor of the accounts of the company.

Mr. Walter Scott (Surbiton) said that for thirty-four years he had travelled up and down between Euston and Liverpool, and had always found that the staff was most ready to do everything they possibly could for the passengers.

Mr. Chamberlain proposed a vote of thanks to the Chairman, which was carried with acclamation.

The Chairman briefly responded, and the proceedings terminated.

SPECIAL GENERAL (WHARNCLIFFE) MEETING

A special general meeting of the London Midland & Scottish Railway Company was held at Euston station on Tuesday, March 15, Sir Josiah C. Stamp, G.C.B., G.B.E., Chairman of the company, presiding.

The Assistant Secretary (Mr. G. Royde Smith), read the notice convening the meeting.

The Chairman said: This meeting has been convened in accordance with the Standing Orders of Parliament in order to submit for the approval of the proprietors two Bills which are being promoted in the present Session of Parliament. I will first deal with the London Midland & Scottish Railway Bill which is being promoted by the company. The objects of the Bill are first to authorise the company to carry out alterations of public road bridges near Blackpool (Central) station, and these are necessary in connection with the proposal to move the station to another site, and I shall refer again to this in a minute or two in dealing with the Blackpool Improvement Bill. The Bill also contains powers for the company to acquire lands in various parts of the system which are required for the improvement of the undertaking, and provisions are included to enable the company to discontinue a small portion of their Newcastle-under-Lyme Canal which is unnecessary for navigation, and the site of which can be sold. Provisions are also included to enable any member of the Superannuation Fund to secure an annuity for his widow or dependents in lieu of part of the benefits which would otherwise be payable in his lifetime.

The Blackpool Improvement Bill is a Bill promoted by the Blackpool Corporation, and your approval is necessary because the Bill proposes to confer certain powers on the company. The Bill confirms an agreement between the corporation and the company for the removal of Blackpool (Central) station to another site to be provided by the corporation, who will then take over the site of the existing station. Detailed powers are conferred on the corporation to secure the carrying out of the scheme and the Bill empowers the company to use the new station as part of their undertaking.

Mr. W. J. Stevens and Mr. Percy Wyatt asked whether the Blackpool Bill curtailed any capital powers for any capital expenditure of the company.

The Chairman explained that the company would have to use some money, but there was money coming to the company from Blackpool as the result of the exchange. The actual capital outlay came from the Blackpool Corporation to the company, and on balance there was an exchange of site and payment in respect of it. The company had to construct its own station. There would be in any case a very large scheme for Blackpool improvement which would be necessary. In arriving at the net expenditure over these matters the amount to be received from the Blackpool Corporation would have to be considered. Any rebuilding which would take place anyway, apart from this scheme, might be somewhere in the neighbourhood of half-a-million, with all the ancillary works and changes, because what was necessary to secure the accommodation in Blackpool for the rapidly increasing traffic was not merely at that point, but extended down the line. This did not involve the issue of any stock. It was part of what had already been provided for, which had been discussed at previous meetings.

The two Bills were approved.

On the motion of Mr. Stevens, seconded by Mr. Wyatt, a very hearty vote of thanks was unanimously passed to the Chairman, officers, and staff for their work during the year, and with particular reference to the co-operation of the staff.

The Chairman suitably replied.

ISLE OF MAN RAILWAY COMPANY

Passengers and parcels attain highest level since 1929

The annual general meeting of the Isle of Man Railway Company was held at the company's offices, Douglas, on March 2, Mr. R. Q. Hampton, H.K., Chairman of the company, presiding.

The Secretary and Manager (Mr. A. M. Sheard) read the notice convening the meeting.

The Chairman, in moving the adoption of the report and accounts, first referred with deep regret to the death on October 28 of the late Chairman, Mr. J. W. Hyde, who, by virtue of his vocation and long experience in local affairs, had been a great asset to the board. No new appointment had been made, and it was recommended that the vacancy should not be filled for the present.

Proceeding to review the business of 1937, the Chairman said that passenger and parcels receipts had been the best since 1929, and it was gratifying to note that the increase in visitors to the island had been reflected in that way. During the season a through train—the Port Erin Special—was run from Douglas non-stop to Port Erin. Goods traffic also showed an increase, and in weight carried constituted a record, although there was a larger proportion of low-rated traffic.

The accounts showed that the increase over 1936 in parcels and passenger traffic amounted to £1,476. Approximately 30 per cent. more people had visited Glen Wyllin during the year, and the net profit from that source improved by about 50 per cent. Total working expenditure increased by £350, caused not only by the rising cost of wages and materials, but by a heavier programme for the maintenance of way and works. The profit on working account was £11,739, which was £1,107 better than in 1936, and, with the year 1934, was outstanding as one of the best results since 1926.

The disposable balance on net revenue account was £6,934. From this the following dividends were recommended: dividend at the rate of 5 per cent. per annum for the half-year ended December 31 on the preference share capital, and a dividend of 2 per cent. for the year on the paid-up ordinary share capital. The board also recommended the transfer of £1,500 to reserve and renewals fund (£1,000 towards further relaying of main line, and £500 for credit to rolling stock suspense account), leaving £1,414 to be carried forward.

The report and accounts were adopted.

XUM

Inauguration of South Shields Electrification, L.N.E.R.

As a corollary to the modernisation of the North Tyneside lines the South Tyneside suburban line has been electrified

(*See illustrations on page* 532)

The new electric passenger train service on the L.N.E.R. between Newcastle and South Shields was inaugurated last Monday. The Lord Mayor of Newcastle drove the first electric train out of the Central station and the Mayor of South Shields started it on its return journey from South Shields. Civic representatives from Newcastle, South Shields, Gateshead, Hebburn, Felling and Jarrow travelled from Newcastle to South Shields and back in the special train, the mayors of the various boroughs taking a hand in driving it. Sir Murrough J. Wilson, Deputy Chairman, Mr. C. M. Jenkin Jones, Divisional General Manager, N.E. Area, and other chief and district officers of the N.E. Area of the L.N.E.R. took part in the inaugural ceremonies.

These events marked the completion of a scheme of work that has cost the L.N.E.R. well over £500,000 and has been in progress for over two years. Not only has electric working been extended from Newcastle to South Shields but the whole of the track equipment on the existing electrified lines between Newcastle and the coastal towns of Tynemouth, Whitley Bay, and Cullercoats, together with the loop line known as the Riverside branch has been modernised. New coaches of up-to-date design have been provided, and 90 of the old electric vehicles have been scrapped. The third-rail system at 630 volts is used.

On the north side of the river the first of the new trains was placed in service on July 30, 1937, and delivery of all the new coaches was completed by the end of last year. On January 3 the completion of the scheme was marked by the inauguration of a new train service. Stopping trains from Newcastle back to Newcastle *via* Tynemouth are now allowed only 53 minutes for the round trip instead of 63 minutes with the old rolling stock, and expresses from Newcastle to Tynemouth take 24 minutes instead of 30.

The newly-electrified line from Newcastle Central to South Shields on the south bank of the Tyne is 11 miles in length. It is a suburban line carrying some 5,000,000 passengers a year. The steam service allowed for a train in each direction every 20 minutes with an overall journey time of 33 or 34 minutes.

Parts of the service on the south line will continue to be worked by steam trains for a few weeks, but immediately after the inauguration last Monday the 12.40 p.m. from Newcastle to South Shields was worked by an electric train and was the first public service. As additional stock becomes available more electric trains will be introduced, and from May 2 an all-electric accelerated service will begin. This will result in the journey time being reduced from 34 minutes to 27 minutes and trains will normally leave Newcastle for South Shields at 0, 20, and 40 minutes past the hour as at present, whilst trains from South Shields will leave at 17, 37, and 57 minutes past the hour instead of 10, 30, and 50 minutes past the hour. A technical description of the electrification works and equipment will appear in our next *Electric Railway Traction Supplement*.

At a luncheon in Newcastle after the return of the special train, at which Sir Murrough Wilson presided, the Lord Mayor of Newcastle, Alderman G. Oliver, proposing the toast of "Prosperity to the New Service," congratulated the company on its progressive policy in providing a service that would meet the convenience of business and work people and also, he hoped, minister to the financial stability and well-being of the shareholders. The Mayor of South Shields, Alderman R. Bradley, supporting the toast, expressed the hope that the company would complete its good work by providing a modern railway station capable of dealing with the increasing crowds that invaded his town, particularly in the summer months.

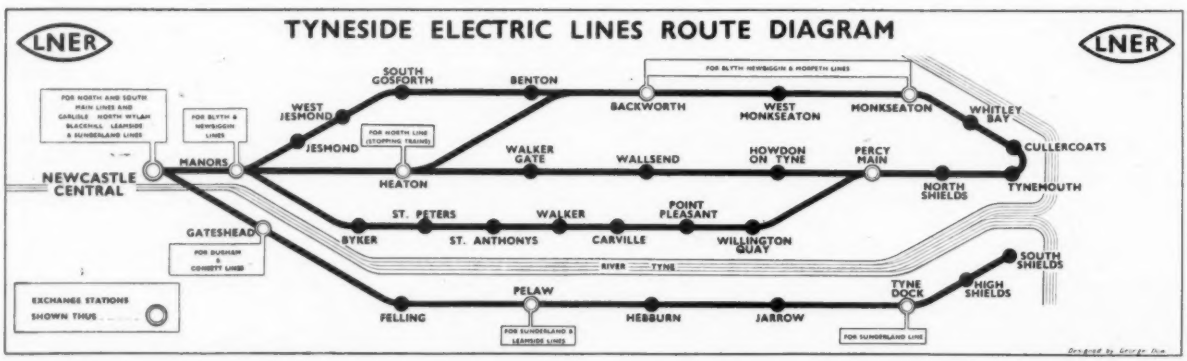
Mr. C. M. Jenkin Jones, responding, claimed that Tyneside was now provided with a passenger service which for cheapness, comfort, speed and safety, would compare with any other in the civilised world—or in America. By modernisation and extension of its electric services the company had shown its confidence in the recovery of the area with the fortune of which that of the railway was indissolubly linked.

Sir Murrough Wilson proposed the toast of "The Guests," and claimed some credit for the railway company in the renewal of the activity on Tyneside. The company valued the goodwill which the district had displayed and expressed the gratification of the directors at the part played by railwaymen in local affairs. Times had changed, and the railway, no longer having a monopoly, had faced its competitors by improvements in its services such as the present electrification, the Silver Jubilee and Coronation trains, and the increasing number of express goods trains.

Sir John Maxwell, Chairman of the Northern Area Traffic Commission, responding, expressed admiration for the initiative of the railway company, which was a good augury for the future.

Among members of the L.N.E.R. present were:—

Messrs. E. M. Rutter (Passenger Manager, York), S. T. Burgoyne (Superintendent, York), P. Gibb (Goods Manager, York), F. E. Harrison (Engineer, York), C. M. Stedman (Locomotive Running Superintendent, York), E. Thompson (Mechanical Engineer, Darlington), T. Gaynor (Divisional Accountant, Newcastle), H. W. H. Richards (Electrical Engineer, King's Cross), P. A. Harverson (Assistant Passenger Manager, York), H. Arnott (Assistant Superintendent, York), J. Taylor Thompson (Assistant Engineer, York), J. J. Lovatt (Assistant Locomotive Running Superintendent, York), W. A. Fiddian (District Superintendent, Newcastle), L. Ballan (District Superintendent, Sunderland), F. C. C. Stanley (District Passenger Manager, Newcastle), H. F. Sanderson (District Goods Manager, Newcastle), H. Hills (District Engineer, Newcastle), G. L. Drury (Assistant Electrical Engineer, Darlington), F. W. Green (District Electrical Engineer, Newcastle), R. G. Kirkup (District Locomotive Superintendent, Gateshead), I. V. Longley (District Locomotive Superintendent, Heaton), C. Murray (Manager, Walker Gate Carriage Works), I. Murray (Manager, Car Sheds, Gosforth), W. H. Brown (Works Manager, York), H. A. Butcher (Stationmaster, Newcastle), W. H. Shannon (Passenger and Parcels Agent, Newcastle), and J. W. Calder (Stationmaster, South Shields).



L.M.S.R. Electrification in the Wirral Peninsula

Through services to Liverpool *via* the Mersey Railway

(*See illustrations on page* 533)

Electric train services over the Wirral lines of the L.M.S.R. were formally inaugurated on Monday last, March 14, by Sir Josiah Stamp, Chairman, London Midland & Scottish Railway Company, and President of the Executive.

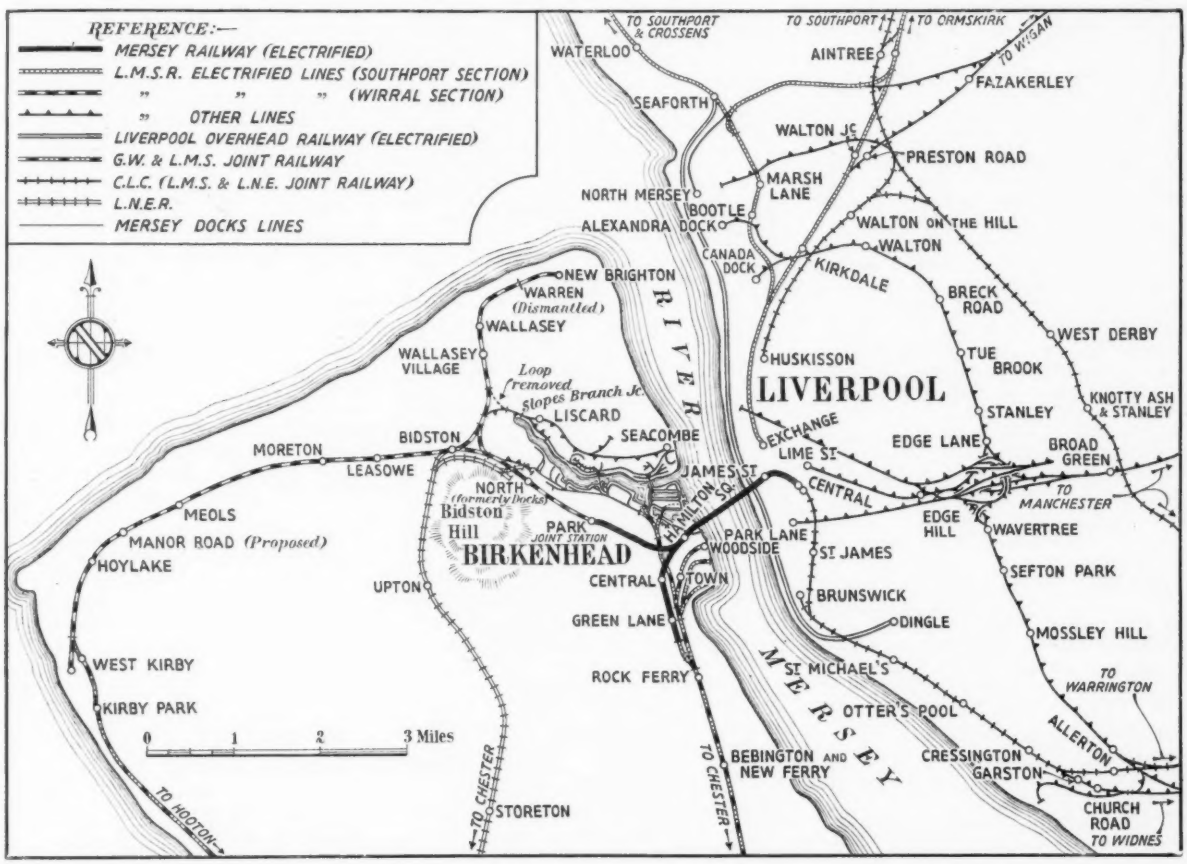
Members of the official party, which included the Lord Mayor of Liverpool and the Mayor of Birkenhead, travelled outward from Liverpool Central (Low Level) station by a Mersey Railway electric train to Birkenhead Park, where they changed into the last steam passenger train to run from Birkenhead Park to West Kirby. From West Kirby the party returned to Birkenhead North by one of the new L.M.S.R. electric trains. There the carriage shed and repair shop and substation were inspected, after which a trip was made to New Brighton and the return to Liverpool made in a L.M.S.R. electric train.

The London Midland & Scottish, and Mersey Railways invited a number of guests, representative of the civic, professional, and business life of Liverpool, Birkenhead and surrounding districts, to take a journey in the trains, and afterwards to luncheon at the Adelphi Hotel, Liverpool.

London Midland & Scottish Railway directors and officers present included: Sir Josiah Stamp, Chairman; Mr. E. B. Fielden, Deputy Chairman; Mr. Charles Booth; Sir Robert Burrows; Sir Robert Greig; Mr. W. L. Hichens and the Rt. Hon. Lord Wigram, Directors; Mr. E. J. H. Lemon, Vice President, Railway Traffic Operating and Commercial Section; Mr. H. V. Mosley, Chief Executive Officer for New Works and Parliamentary Business; Mr. Ashton Davies, Chief Commercial Manager; Mr. G. Morton, Chief Accountant; Mr. W. A. Stanier, Chief Mechanical Engineer; Mr. W. K. Wallace, Chief Civil Engineer; Mr. C. E. Fairburn, Deputy Chief Mechanical Engineer and Electrical Engineer; Mr. G. H. Loftus Allen, Advertising and Publicity Officer; Mr. W. H. C. Clay, Estate Manager; Mr. A. F. Bound, Signal and Telegraph Engineer; Mr. S. B. Carter, Outdoor Superintendent, Commercial and Operating Department; Mr. T. W. Royle, Chief Assistant Commercial Manager; Mr. S. E. Parkhouse, Divisional Superintendent of Operation, Crewe; Mr. F. R. Hauxwell, District Goods Manager, Liverpool; Mr. R. D. Roberts, Dock and Port Officer, Garston Docks; Mr. W. H. K. Gyles, District Engineer, Liverpool.

Mersey Railway: Mr. J. Waddell, Chairman; Mr. A. D. C. Parsons, Deputy Chairman; Messrs. C. A. Jones and J. Shaw, directors; Mr. Robert Varley, Acting General Manager and Engineer; Mr. J. E. Blackman, Secretary and Accountant; Mr. A. W. Air, Deloitte, Plender, Griffiths & Co., Auditors.

Others present included: Sir L. A. P. Warner, General Manager and Secretary, Mersey Docks & Harbour Board; Lt.-Col. A. H. L. Mount, Chief Inspecting Officer of Railways; Lt.-Col. Moore-Brabazon, M.P.; Mr. W. L. Box, General Manager, Liverpool Overhead Railway; Mr. G. Leedham, Manager, Cheshire Lines Committee; Mr. H. S. Owen, District Goods Manager, Manchester, L.N.E.R.; Mr. J. R. Morris, Divisional Superintendent, Chester, G.W.R.; Mr. G. Cornish, District Goods Manager, Liverpool, G.W.R.; Mr. A. J. Boyd, Managing Director, Metropolitan-Cammell Carriage & Wagon Co. Ltd.; Mr. H. J. Moyses, Managing Director, Birmingham Railway Carriage & Wagon Co. Ltd.; Mr. J. A. Kay, Editor, THE RAILWAY GAZETTE; Mr. D. R. Lamb, Editor, *Modern Transport*; Mr. W. S. Roberts, Director, Railway Signal Co. Ltd.



Map showing recently-electrified Wirral lines, L.M.S.R., and the Mersey Railway

The Wirral electrification has been carried out by the L.M.S.R. under the Government loan guarantee schemes of the Railways (Agreement) Act, 1935. The electrification covers 24 single track miles, comprising the lines from West Kirby and New Brighton to Birkenhead Park, where the Mersey Railway is joined. A feature of the new arrangements is that joint through services between Liverpool and the Wirral peninsula are being provided by the L.M.S.R. and the Mersey Railway. During the rush hours there will be a 10-min. service between Liverpool and West Kirby, and Liverpool and New Brighton, this resulting in a 5-min. service between Liverpool and Birkenhead Park. During the rest of the

day a 15-min. service (7½-min. to and from Birkenhead Park) is being run. The standard timing between Liverpool and West Kirby has been reduced to 29 min. from the steam average of 36 min., while on the New Brighton line the end-to-end time is now 20 min. compared with 27 min. in steam days.

The new services are being worked, as far as L.M.S.R. stock is concerned, by 19 three-car all-steel trains, two of which are coupled in multiple-unit during busy periods. They have a seating capacity of 181, and air-operated sliding doors are fitted. Power is being supplied from the generating station belonging to the Liverpool municipality, and the feeder cables are carried below the river in the Mersey Railway's tunnel to the first L.M.S.R. substation at Birkenhead North. Of the six rectifier substations, five are remotely controlled from the Birkenhead North substation. The power supplied to the conductor rail is 650 volts d.c. The extensive station alterations and other civil engineering works are described elsewhere in this issue of THE RAILWAY GAZETTE, and the other technical features of the conversion will be covered in the April 1 issue of our *Electric Railway Traction Supplement*.

Presiding at the luncheon on March 14, Sir Josiah Stamp, in replying to the toast of "Success to the Wirral Electrified Lines," proposed by the Lord Mayor of Liverpool, drew particular attention to the up-to-date technical details (as noted above) which characterised this important development in Merseyside transport.

Mr. John Waddell, Chairman of the Mersey Railway, who supported Sir Josiah in the reply to the toast, briefly described the stages in the history of his line, which was the first steam-worked railway in England to be converted to electric traction.

RAILWAY CLUB ANNUAL MEETING.—The annual general meeting of the Railway Club was held at the Royal Scottish Corporation Hall, Fetter Lane, E.C.4, on Thursday, February 17, 1938. After the conclusion of the formal business, the President, Mr. Kenneth Brown, delivered his Presidential address entitled "Railways-in-Law." Describing his address as grains of railway history gleaned from law reports, Mr. Brown first referred to the case of the King *v.* Edward Pease, 1832. This case established the legal right of railways to be operated by steam. Next the prolonged litigation between Bacon and the Newcastle & Carlisle Railway was dealt with. The ambitious Manchester & Milford Railway was involved in numerous legal disputes, and the President referred to reports of Chambers *v.* M. & M.R., Carmarthen & Cardigan R. *v.* M. & M.R., and *in re* M. & M.R. Finally, the closing of the Potteries Shrewsbury & North Wales Railway was described and the eventual acquisition of this line by the Shropshire Railway.

STAFF AND LABOUR MATTERS

Holidays with Pay

Between 70,000 and 80,000 more workpeople are to receive holidays with pay under agreements recently concluded. At a meeting held in Manchester on March 4 between representatives of the Lancashire & Cheshire Coalowners' Association and the Lancashire & Cheshire Mineworkers' Federation, agreement was arrived at as to the terms of a new wages agreement to come into operation as from July 1 next. The concessions made by the owners include the following:—A week's holiday with pay, commencing during the coming summer, is to be granted to all workers in the industry. The rates of pay will be:—

	£	s.	d.
For males of 21 and over ...	3	0	0
For males of 18 and under 21 ...	1	10	0
For males under 18	1	0	0
For females of 21 and over ...	1	10	0
For females under 21	1	0	0

Under an agreement between the Iron & Steel Trades Confederation and the Iron & Steel Trades Employers' Association, seven days' holiday, in addition to existing holidays, with payment of wages up to a maximum of £1 per shift will be granted to all workpeople who qualify. The qualification period is 50 weeks' work each year with an allowance of 4 weeks for certified illness.

Employers' Liability (Common Employment) Bill

This (private member's) Bill consisting of one substantive clause, as follows: "As and from the first day of August, nineteen hundred and thirty-eight, it shall *not be a defence* to an employer who is sued in respect of personal injuries caused by the negligence of his servant, that such servant was at the time such injuries were caused in *common employment* with the person injured," was rejected by 142 votes to 122 when it came up for second reading in the House of Commons on Friday, March 11. Bills in identical terms were introduced in the House of Commons in 1934, 1936, and 1937. The 1934 Bill after receiving a second reading was withdrawn in the committee stage. The 1936 and 1937 Bills were refused a second reading by a majority of 51 and 28 votes respectively.

Road Transport—Wages

Negotiations are still proceeding in connection with the dispute in the road transport industry, and, although almost one week of the fortnight's notice given by the trade unions to withdraw labour has expired, a settlement has not yet been reached. It is understood that in response to a request from the Transport and General Workers' Union for co-operation in the event of a strike, two of the railway trade unions—the National Union of Railwaymen and the Associated Society of Locomotive Engineers & Firemen—have agreed to render assistance. A statement issued last week-end by the employers' side of the National Joint Conciliation Board for the Road Transport Industry (Goods) reads: "Negotiations have been proceeding for some time for a variation of wages and working conditions in the goods section of the road motor transport industry. Many difficulties have arisen and a satisfactory conclusion has not yet been reached. A further joint meeting has been arranged for the end of next week, and it is hoped that outstanding differences will then be disposed of." It is understood the meeting of the National Joint Conciliation Board will take place this Friday, March 18.

L.M.S.R. (London) Musical Society

This week the London Midland & Scottish Railway (London) Musical Society is giving four performances, at the Scala Theatre, of "The Gipsy Princess." At the opening performance on Monday, Mr. Ashton Davies, Chief Commercial Manager, invited a number of guests, who, with the rest of the audience, much appreciated the production. Various officers of the company have attended other performances, which are continuing until tomorrow, Saturday, evening. Sir Josiah Stamp is the President of the Society, Mr. W. E. C. Lazenby, Chairman, and Mr. George Gray the Honorary Secretary. The society is once again indebted to Lloyd's Light Orchestra for its co-operation in the production. The producer, Mr. Arthur Chapman, and the Musical Director, Mr. Arthur Waller, are again to be congratulated. The chorus and dancers total over 50. As in previous productions by the L.M.S. Musical Society, Miss Lucy Sander (as Sylva), Miss Marjorie Ellisdon (as Countess Stasi), Mr. Reginald Brockwell (as Count Feri), Mr. Arthur Lloyd (as Prince Ronald), and Mr. Fred Bishop (as Lord Boniface) again distinguished themselves. This (Friday) evening, the society is to be visited by the Lord Mayor of London, Sir Harry Twyford. He will be accompanied by the Lady Mayoress, Sheriffs of the City of London, and their ladies, and will be supported by Sir H. Percy Shepherd, C.C., and Lady Shepherd, together with officers of the L.M.S.R. This year's production marks the twenty-fourth season of the society.

Forthcoming Meetings

March 23 (*Wed.*).—**East Kent Light Railways Company** (Ordinary General), Waterloo Station, S.E., at 12·30 p.m.

May 4 (*Wed.*)—**Canadian Pacific Railway Company** (Annual General), Company's Principal Office, Montreal, at noon.

Retired Railway Officers' Luncheon

Viscount Horne, Chairman of the Great Western Railway, was the chief guest at a luncheon of the Retired Railway Officers' Society held at the Charing Cross Hotel, London, on March 10. Mr. S. L. Murgatroyd, President of the society, was in the chair. The following members and guests were present:—

Messrs. H. D. Anderson, G. Barriball, W. E. Bradbury, W. P. Bradbury, J. F. Bradford, M. H. Brady, F. S. Bridge, J. F. Brook, A. H. Bull, H. R. Campfield, A. L. Castleman, G. J. Chesters, W. J. Clayton, Major A. Clear; Messrs. E. A. Clear, A. C. Cookson, E. C. Cookson.

Messrs. J. M. Darville, C. R. Dashwood, R. G. Davidson, G. Cole Deacon, A. E. Dolden, W. D. Duffield, C. W. Edwards, H. Ferguson, L. C. Geach, L. Glenister, F. W. Green, H. J. Guest, E. B. Hassall, H. J. Hoskins, A. Howie, G. Hughes, W. Humphreys.

Messrs. W. E. James, S. F. Johnson, W. R. Jones, Sir Cyril Kirkpatrick; Messrs. J. W. A. Kislingbury, F. W. Lampitt, J. W. Lovejoy, T. E. Lovell, D. McCulloch, A. Maynard, Lt.-Colonel P. D. Michôd; Messrs. A. S. Mills, J. C. Mitchell W. R. Mole, Lt.-Colonel Sir Charles Morgan; Messrs. C. H. Newton, R. H. Nicholls, R. H. B. Nicholls, A. W. Norman, E. E. Painter, F. K. Pelly, J. Pike, J. R. Pike, P. W. Pine, H. W. J. Powell, A. Puleston, W. H. J. Pyne, D. Poyntz Ricketts.

Capt. C. Ricketts, Messrs. C. A. Roberts, S. Roberts, M. D. Robinson, R. Rowbottom, J. E. Ryan, F. A. Sargent, C. J. Selway, G. G. Senior, T. H. Shipley, J. Procter Smith, D. Spooner, Mr. Gilbert S. Szlumper.

Messrs. W. A. Thomas (Hon. Sec.), H. Thompson, Major W. E. Thornhill; Messrs. A. Twist, W. T. Venton, A. Walker, G. J. Walker, Major H. A. Watson; Messrs. G. H. Wheeler, A. W. Willet, J. Williams, W. A. Willox, Lt.-Colonel J. S. Wilson, Messrs. S. G. Wood, J. H. Woodhead, W. Yates.

The President, after the loyal toast had been honoured, proposed "The Guests." He said he was often asked how retired railway officers spent their lives. In their society, he explained, they had monthly meetings at which members gave talks, often on their own railway or travel experiences. Also, out of their membership he should say at least 90 per cent. had taken up public work of some kind or another. There was a great demand for retired or present railway officers to participate in local government, where their knowledge must be of value, and, he believed, was very much appreciated. They had as their guest Viscount Horne, whom they congratulated upon his Coronation honour of last year. Not only was Lord Horne interested in, and a Director of, some very important works, such as the Suez Canal and Lloyds Bank, but he was Chairman of one of the best railways. The President also referred to Lord Horne's political career, during which he had held the offices of First Civil Lord of the Admiralty, Minister of Labour, President of the Board of Trade, and Chancellor of the Exchequer.

Lord Horne, replying to the toast, expressed his gratification at having been asked to be the guest of the retired railway officers, and said it would be interesting to know why railway officers lived so long. They had in their society Mr. Drury, who was about to "carry out his bat" for a century; and Mr. Sarjent, whose eightieth birthday it was that day. Perhaps the longevity of many railway officers was due to the fact that those who were prone to irritation died young, but the others, who regarded criticisms from press and public in their correct proportion, attained the serenity which was undoubtedly the best foundation of a long life. He would enter the Great Western Railway for the longevity prize, because they had Sir Ralph Cope, who had just accomplished 61 years of continuous service with the company.

The retired railway officers were the men who had got the railways through the first and deepest parts of the depression with which they had been confronted, and everybody engaged today in operating railway services must feel a very deep debt of gratitude to those who had gone before. He would much regret it if the men at present in charge should get out of touch with those who had built up the system, and he hoped the society would keep very close contact with the serving officers, and also maintain the railway cause against much unjustifiable criticism from the outside. He was looking forward with great confidence to the future, and in that confidence he hoped he would be able to rely upon the loyalty of the men who had already passed through the service.

Mr. Gilbert S. Szlumper, General Manager of the Southern Railway, proposed the toast of "Success to the Retired Railway Officers' Society." He said that no success they might wish the society could increase that which it already enjoyed. Yet success they obviously did wish it, and did their best to keep its ranks filled up. He hoped they would keep a place for him. Mr. Szlumper subscribed most heartily to the value of railwaymen in local affairs. The railwayman was a good, hard-headed business man who could be of the utmost assistance in such matters. The retired railway officers had the utmost good will of their guests, the serving officers, who would do all they could for the society. To the serving officers, the request of the society became an order.

Mr. C. J. Selway, Passenger Manager, Southern Area, L.N.E.R., in seconding the toast, said there was every reason to be grateful to the retired officers. It would be a wonderful thing if use could be made of the knowledge and experience of those who had retired. The speaker instanced various directions of current railway enterprise in which appeal to past experience might be valuable, and mentioned the latest excitement—Southern Sales—which he believed was expected to rival football pools in popularity. He thought that the existence of an advisory tribunal of retired officers would give encouragement to those who were still groping their way forward.

The President, replying to the toast on behalf of the society, said they were looking forward to the time when the two previous speakers joined their ranks. He thanked them for the good wishes they had expressed.

G.W.R. (London) Operatic Society

The above society gave three performances of Messager's opera, "Véronique," at the Scala Theatre, London, on Thursday, Friday, and Saturday of last week. A tribute is certainly due to Miss Joyce Hewitt who, in her dual rôle of Hélène and Véronique, acted and sang charmingly throughout; Mr. Frederick Blizard gave a virile rendering of his part as Florestan de Valancourt and in the duets his voice was heard to advantage. In the lighter rôles Mr. Jack Sealey as Monsieur Coquenard, and Mr. Reginald Tuffrey as the *passé* and tatterdemalion Baron de Merlettes were both first rate, and however much modern buffoonery and anachronistic jesting may have clashed with second Empire *décor* and environment, the spontaneity of their wit and gestures could not be questioned.

The remaining principal parts were commendably acted by their respective interpreters, and in the choruses and ensembles the general company displayed notable cohesion and resonance. Nor must one forget the orchestra, who, under the skilful guidance of Mr. Charles Gardiner, were never once at fault. The entire production was in the hands of Mr. Frederick G. Lloyd, who is to be congratulated on an outstanding success.

Among the audience were the following directors and officers of the G.W.R.: Lord Palmer, Deputy Chairman; Lord Mildmay of Flete, Lord Portal, the Earl of Mount Edgcumbe, Directors; Sir Ralph Cope, Chief Accountant; Mr. C. R. Dashwood, Assistant General Manager; Mr. R. Carpmael, Chief Engineer; Mr. F. R. Potter, Superintendent of the Line; Mr. A. S. Quartermaine, Deputy Chief Engineer; Mr. H. Wheeler, Assistant to General Manager; Mr. H. W. Payne, Principal Assistant to Chief Goods Manager; Mr. G. E. Orton, Commercial Assistant to Superintendent of the Line; Mr. C. Furber, Mineral Traffic Manager.

REVISED B.S.S. FOR PAINT MATERIALS.—British Standard Specifications for paint materials (B.S.S. No. 255, Extenders for Paints, B.S.S. No. 331, Driers for Paints, B.S.S. No. 370, Venetian Red for Paints) have recently been issued and copies can be obtained from the British Standards Institution, 28, Victoria Street, S.W.1.

The Freight Traffic Activities of Crewe

Crewe, which last year celebrated its centenary as a railway station, is well in the public eye as one of the world's greatest passenger railway junctions. That its extensive passenger business by no means overshadows its freight traffic activities is shown by an article by Mr. G. Cherrington in a recent issue of *On Time*, the journal of the L.M.S.R. Operating Department.

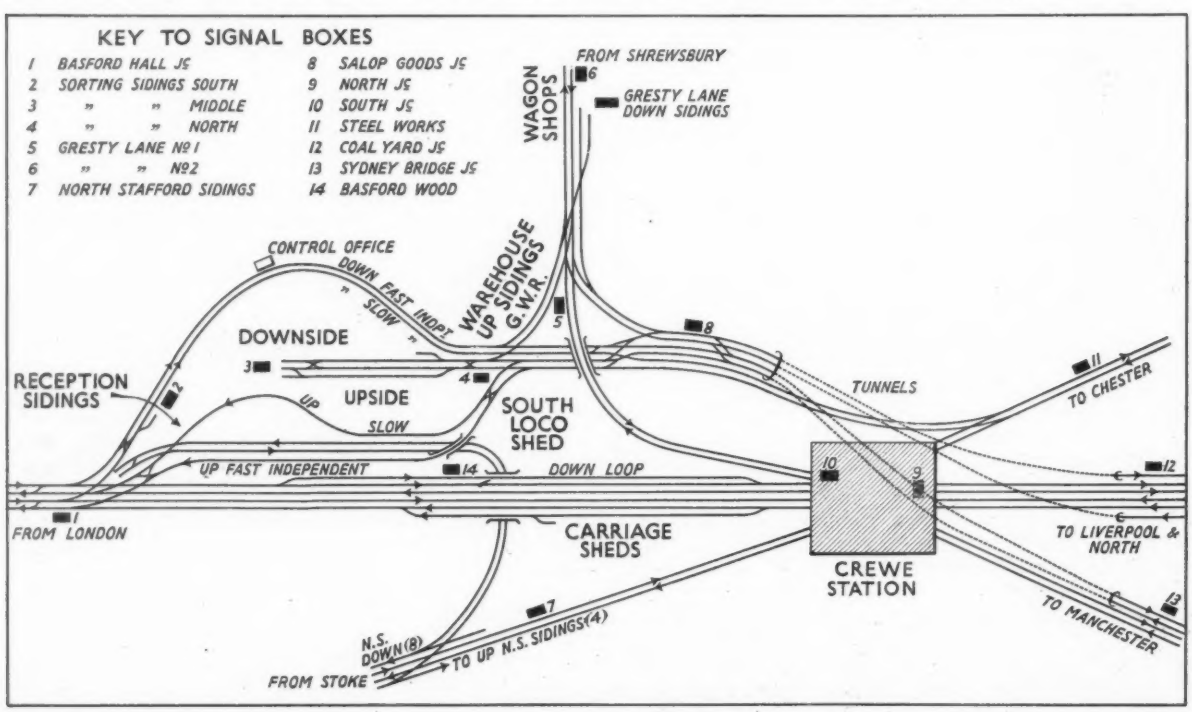
In a normal week, between 46,000 and 47,000 wagons, conveying all kinds of loads and emanating from almost every corner of the British Isles, are detached at Crewe. There are over 200 inward freight trains and local trips, which detach on an average 7,000 wagons each 24 hours. After shunting and remarshalling, these wagons are dispatched on 200 outward freight trains. This work is carried on at Basford Hall sorting sidings, Crewe N.S. up and down, and Gresty Lane up and down sidings. In addition, approximately 400 wagons of "smalls" are placed on the north end of Crewe tranship shed and, after passing through, are handed to traffic at the south end of the warehouse, to be marshalled into the outward freight trains. For such a volume of traffic to pass through a tranship shed, in addition to the heavy exchange of traffic in the marshalling sidings, is a peculiar but convenient feature of operation at Crewe. Up freight traffic is diverted from the North and Liverpool line at Crewe coal yard, and from the Manchester line at Sydney Bridge junction to the up independent lines, which run underneath North junction by means of tunnels, and so to Salop Goods junction, where the trains are regulated to Gresty Lane No. 1 or Basford Hall S.S. North and thence to Basford Hall up sidings. Freight traffic from Chester and North Wales direction is diverted at Crewe North junction to the up Chester independent line, which also runs via Salop Goods junction to S.S. North and Basford Hall up sidings.

In the down direction, freight traffic from Birmingham, London, and the South is diverted via the down fast and slow independent lines or via the sorting sidings, at Basford Hall junction, to either S.S. South, S.S. Middle, or S.S. North, whilst trains from the Shrewsbury and G.W.R. system are regulated at Gresty Lane No. 2 box to Nos. 1 and 2 arrival lines and are dealt with at Gresty Lane down marshalling sidings. This group, comprising 19 sidings, deals with all trains from Shrewsbury and the G.W.R., and detaches an average of 1,100 wagons a day. Upwards of 400 wagons are exchanged between these sidings and Basford Hall sidings daily, and these wagons have to cross the up and down main Crewe to Shrewsbury lines at Gresty Lane No. 1 box. Outward trains are dispatched via the two through sidings to Gresty Lane No. 1 box and from there to Salop Goods junction and the tunnel lines to Liverpool, Manchester, L.N.E.R. via Guide Bridge and via Leeds, and Scotland via Carlisle.

Traffic to and from the North Staffordshire district is handled at the N.S. up and down sidings, up trains travelling via Crewe station and South junction to exchange traffic at the N.S. up sidings. Down traffic is shunted at N.S. down sidings, where it is either marshalled on forward trains or tripped to Basford Hall over the N.S. Cutting lines to S.S. South, and there placed in the down sorting sidings. The sorting sidings at Basford Hall comprise 50 sidings, situated between the running lines, with three reception lines between the up and down sides. The up side has 20 stop block sidings, whilst on the down side there are 30 double ended sidings, available at either S.S. Middle or S.S. North, trains being marshalled at S.S. Middle and dispatched from S.S. North to Shrewsbury via Gresty Lane, Liverpool and North; Manchester and Chester via Salop Goods junction, and thence as explained previously by way of the tunnel lines to Sydney Bridge or Crewe coal yard for Manchester and Liverpool and North, respectively, and via the Chester independent line for Chester and North Wales.

Up freight trains are shunted and remarshalled at Basford Hall up sidings, being received from three up receptions or from the up slow goods line, and from 1,400 to 1,500 wagons are detached in 24 hours. Trains which are not timed for traffic exchange, but only for examination or change of engines, are dealt with at S.S. South, to which point they are regulated by S.S. North over the up fast independent line, which line is not signalled to S.S. Middle. All up freight trains from S.S. Middle and S.S. South are then put on the up fast or slow main line at Basford Hall junction.

During the heavy Easter, Whitsun, and August holiday periods, and at



Plans showing how the various lines approaching Crewe are interconnected and linked up with the sorting sidings

week-ends from Spring to late Autumn, the independent lines are further heavily occupied by a number of passenger trains which travel via Basford Hall junction, S.S. Middle and Gresty Lane No. 1 to Salop Goods junction for Manchester, Liverpool and North, and Chester and North Wales and *vice versa* in the return direction. This, by avoiding Crewe station, allows freer passage for trains not timed to stop there, and also relieves congestion, which would otherwise be inevitable due to the heavy excursion train working. During the August Bank Holiday week-end last year over 70 passenger trains were worked over these lines.

The signal boxes which control these vast freight activities are as follow:—Basford Hall Junction (67 levers), Basford Wood (open for one turn of duty only, 28 levers), Basford Hall S.S. South (up direction only, power, 60 levers), Basford Hall S.S. Middle (power, 152 levers), Basford Hall S.S. North (95 levers), and Gresty Lane No. 1 (power, 66 levers).

Institution of Civil Engineers Dinner

The annual dinner of the Institution of Civil Engineers was held at Grosvenor House, London, on Tuesday, with Mr. S. B. Donkin, President of the institution, in the chair.

The Rt. Hon. Leslie Burgin, Minister of Transport, in proposing the toast of the institution, said that the age of road and bridge construction in Great Britain had returned. About £60 million a year was spent on road maintenance and construction. Under the Trunk Roads Act, 1936, he had become responsible for 4,500 miles of trunk roads, which he hoped to bring up, as speedily as circumstances permitted, to the requisite standard for providing safe and expeditious transit for all classes of traffic. His aim was to make the roads justify again their fine old title of the "King's Highway." Separate provision for motorist and cyclist had today become a necessary part of such arrangements. To combat the effects of neglected town-planning and sporadic development of built-up areas, a regional plan was necessary for the future, and adequate communications were the first essential of such a plan. He appealed to all engineers to take a lead in helping to evolve a plan for the country as a whole. Particularly he appealed to young engineers, to study the subject, and do for this generation what so many of their predecessors, with infinitely less resources, did for theirs.

The President replied to the toast on behalf of the institution.

Professor C. E. Inglis (Member of Council) proposed "The Guests," to which Monsieur C. R. Paravicini (Swiss Minister) and Sir Henry T. Tizard (Rector of the Imperial College of Science and Technology) replied.

MINISTRY OF TRANSPORT ACCIDENT REPORT

Liverpool Central, Cheshire Lines: October 4, 1937

At about 2.41 p.m. the 7.25 a.m. express, Harwich to Liverpool, consisting of 7 bogie coaches drawn by L.N.E.R. 2-6-0 Class "K3" engine No. 3817, was entering No. 1 platform on a sharp curve when the engine came into contact with the platform coping, doing considerable damage. The engine stopped 134 yd. from the point of contact, with all except the leading coupled wheels derailed. The first four coaches were derailed and the leading bogie of the fifth. Casualties were trifling. The weather was fine. Colonel A. C. Trench conducted the inquiry.

The speed limit is 10 m.p.h. for all trains entering the station, which is approached through several tunnels on varying gradients, but on a down grade of 1 in 96 for 400 yd. before the last tunnel mouth. There are outer and inner home signals (colour-lights) and a directing home (semaphore) with route indicator. The outer home, in cutting, cannot be cleared until there is a clear path to a platform. If the platform is partly occupied, yellow is shown at the inner, and double yellow at the outer home.

At the entrance to No. 1 platform the permanent way was 95-lb. standard, checked. The sleepers were considerably side cut but the fastenings not loose. The curve was nominally 7-ch. radius but varied between 5 and 9½ ch. and had an irregular cant. Generally the track was suitable only for the low speed specified. No damage or defects were observed in the tunnel, but beyond the nose of a 1 in 7 crossing at the mouth track was displaced. It is difficult to think that derailment can have occurred within 190 ft. from the nose. Beyond the check rail all sleepers were broken and the rails completely spread for some 300 ft.

The engine had run only 23,000 miles; and no defects were found which might have led to derailment. The right hand leading step bracket was bent back and the cylinder cover had the mark of a heavy blow. The underside of the upper step clearly struck and rode up the platform ramp. Final derailment was due either to coping stones falling ahead of the engine, or pressure from some large stones jammed between engine and platform.

Driver Duckworth was well acquainted with the road and left Manchester on time. The brake worked well and he applied it for the 25-m.p.h. restriction at Brunswick curve, 1¾ miles out. He estimated his speed at the outer home as 30 m.p.h. and on emerging from the tunnel 12 m.p.h. The engine was then riding roughly but the first violent shock was when the platform was struck. He was thrown down and had to get up before he could brake fully. Fireman Ellison had not worked with Duckworth before and only occasionally into Liverpool Central. He thought speed was normal but felt a lurch on leaving the tunnel; the driver called for sand but before he could apply it they struck the platform. Guard Brookes thought speed normal on Brunswick curve, but that it became too high at the gradient summit. Two turns of the hand brake had no effect and he was going to the vacuum handle when he was thrown down. Several witnesses testified that the train entered the station much faster than usual; the station foreman thought its speed 35 m.p.h.

Inspecting Officer's Conclusions

Driver Duckworth must be held primarily responsible for the accident, attributable to excessive speed. Both evidence and material damage indicate speed much in excess of 10 m.p.h. Duckworth may have lost his location in the last tunnel and not realised the proximity of the station. He has 18 years as a driver and a fairly good record.

Some responsibility should be attributed to Guard Brookes; had he looked at the gauge when he noticed the speed was high and seen the brake not applied he would have had time to act and probably prevent the accident. He has 31 years' service, passenger guard one year, and a clear record.

Recommendations

The approach to this terminus, through a long tunnel liable to obscuration with smoke and steam, is not easy; but similar, and more difficult, conditions prevail elsewhere; there can be no risk of missing the outer and inner home signals, and once a driver has seen a "proceed" indication at the former, conspicuous in the open, he knows he has a clear run through into the station. No alteration of the existing signalling or lighting in the tunnel appears needed.

Despite the low speed restriction, the track at the entrance to No. 1 platform requires strengthening in view of the sharp curvature, and is being renewed. The coping of the platform ramp and immediately adjacent thereto could be set back further from the rail and this would be advantageous.

RAILWAY COLLISION IN SICILY.—A Reuters message from Messina, Sicily, states that a railway accident, in which 12 persons lost their lives and seven were seriously injured, occurred on March 12 on the line between Messina and Syracuse. A diesel railcar set ran head on into a goods train, the coaches of the former being smashed to pieces. Four railway employees are among the dead. It is thought that the accident may have been due to a mistake by a signalman.

XUM

PARLIAMENTARY NOTES

Progress of Railway Bills

A Committee of the House of Commons, with Sir Richard Meller as Chairman, will begin on April 5, the consideration of Group D of four Private Bills, of which the last two are the Southern Railway and the London & North Eastern Railway Bills. Standing Orders have been complied with in the case of these two Bills, except in respect of the additional provision in the L.N.E.R. Bill. This additional provision gives the company power to construct a short railway in Northumberland making a direct connection between the Rising Sun Colliery at Wallsend and the company's Northumberland Dock branch.

Bombay, Baroda & Central India Railway Bill

This Bill, which was passed in the House of Lords on March 1, was read a second time in the House of Commons on March 14, and committed. It has been referred to the Committee on Unopposed Bills. The objects of the Bill are (1) to enable the company itself to provide road and air transport or to make arrangements with other companies, bodies, or persons for the provision and financing of such services, and (2) to amend Section 27 of the Bombay, Baroda & Central India Railway Act, 1906, which relates to contracts, with the Secretary of State, by including therein the matters abovementioned.

Blackpool Improvement Bill

This Bill came on Monday (March 14) before a Select Committee of the House of Commons presided over by Sir Alexander Russell. It is being promoted by the Corporation of Blackpool and its main purpose is to provide for the carrying into effect of an agreement between that body and the London Midland & Scottish Railway Company for the removal of the Blackpool Central station to another site in the neighbourhood of Chapel Street and Central Drive. All opposition had been withdrawn except that of a group of property owners.

Sir William Jowitt, K.C., opening the case for the promoters, said that the corporation in pursuit of its plans for mass recreational facilities had spent £1,500,000 on promenades, sea defence works, and other works. Its growth had, however, been uncontrolled and sporadic. It lacked a focal centre and contained congested areas. Regarding the railway scheme, he said that the company realised that the present Central Station was quite inadequate to the needs. Under the agreement the company was to construct a new station on new lands and to dismantle the existing station, handing over land to the corporation, which, in its turn, was to provide part of the land on which to build the new station.

Evidence in support of the Bill was then given by Alderman T. Fenton, Deputy Mayor of Blackpool, and by Mr. James Drake, Deputy Borough Engineer and Surveyor.

After the luncheon adjournment Sir William Jowitt announced that agreement had been reached with the remaining petitioners.

Mr. Ashton Davies, Chief Commercial Manager, L.M.S.R., then gave evidence explaining that he had been convinced for some time of the necessity, as a result of the growing rail traffic to Blackpool, for the company to embark upon a comprehensive scheme which would not only provide the requisite terminal facilities in the way of platform accommodation and public amenities, but also the necessary working facilities such as adequate stabling accommodation for the trains, up-to-date facilities for refuelling engines and so on, at Blackpool Central. The difficulties which had to be met arose during periods when the peak traffics were being handled, namely the extreme peaks at Bank Holiday and Illuminations periods and the very heavy traffic during summer week-ends.

Mr. Ashton Davies submitted statements illustrating the above points and the volume of traffic which had been handled. In the Blackpool area, which included all the Blackpool stations and Fleetwood, St. Annes and Lytham, the number of tickets collected week by week from the last week in June until the last week in October in the years 1933 to 1937 inclusive showed an increase of 30·54 per cent. in the 1937 period over the corresponding period in 1933 for inwards traffic. While the number of passenger journeys for the whole system during the months July to October, 1937, increased 12·71 per cent. in comparison with the corresponding period in 1933, the figures in respect of Blackpool indicated an increase of over 30 per cent. Comparing with the same period in 1923 the line position in 1937 revealed a decrease of 5·60 per cent. in passenger journeys, but Blackpool journeys showed an increase of 99·13 per cent. The Saturday preceding August Bank Holiday was the peak period for inwards traffic, and the figure for that day in 1937 revealed an increase of 35·81 per cent. compared with 1922. The peak for the return traffic from Blackpool was on the Saturday following the August Bank Holiday. Another table showed the remarkable expansion of longer distance passenger traffic to Blackpool in 1937 in comparison with 1934. From Belfast, for instance, the increase in journeys was 9,213 or 75·59 per cent., from Glasgow there was an increase of 13,845 or 89·92 per cent., and from London an increase of 15,323 or 37·63 per cent.

The existing station at Blackpool Central was in two distinct sections—the main station consisting of six platforms and the excursion section with eight platforms. The excursion platforms were uncovered and there was no protection from the weather. The layout of the station was such that it was impossible with the volume of traffic at present existing to work it in a satisfactory manner. Owing to the limited siding accommodation a considerable number of trains at peak periods had to be worked to outlying points for stabling purposes, and later had to be brought back to Blackpool Central for the return working. This contributed to the density of operations on the lines between Blackpool and Preston and mitigated against the most effective use being made of the running lines for the operation of loaded trains. The accommodation for engines was also inadequate in extent and unsatisfactory in layout. In regard to the length of the present platforms it should be noted that the instructions provided for all trains into Blackpool Central to be limited to eleven bogie vehicles.

During the past four years the company had spent over £35,000 in resignalling the lines between Preston and Blackpool and increasing the number of block sections by 10 in the down direction and 14 in the up direction. This should give a maximum capacity of 30 trains an hour in each direction, but owing to present terminal conditions this maximum could not be realised as trains could be operated at a greater speed than the existing Central station could deal with them. The scheme for reconstructing the Central station would remove the present difficulties and provide facilities for a considerably increased traffic. The new station would comprise, in the first place, 12 platforms, each of which would take a 14-coach train, thereby increasing the capacity of trains by about 30 per cent. Provision was also made for 2 additional platforms if required. The present intention was to roof over about half the length of each platform. The scheme also provided for a new engine shed with coaling and ash-lifting plant and 70 ft. turn-table, in a position convenient to the new station. With remodelled carriage sidings the total number of coaches for which stabling accommodation would be available at the Central station under the scheme would be 1,124 as compared with 459 at present. The Corporation had agreed with the company as to gardens or an open space being provided in front of the new station. He regarded the whole scheme as satisfactory and necessary from the railway standpoint in order to deal with the traffic under the scheme the company would be able to handle with speed and comfort a considerable increase in passenger numbers.

The Committee found the preamble of the Bill proved, and it was ordered to be reported to the House.

XUM

QUESTIONS IN PARLIAMENT

Cheap Day Tickets
Question of Limitation of Liability

Mr. Robert Gibson (Greenock—Lab.) on March 9 asked the Minister of Transport whether, in view of the fact that the railway company concerned agreed not to insist on its immunity from liability to the holders, or representatives of holders, of cheap tickets in the Castlecary disaster, and the desirability of having such immunity discontinued, he was now prepared to introduce legislation for this purpose.

Dr. Leslie Burgin (Minister of Transport): I am actively continuing my discussions with the railway companies on the question of the limitation of liability which they attach to cheap day, half day, and evening tickets, and workmen's tickets. I will let the hon. and learned member know as soon as I am in a position to make a statement.

Railway Electrification

Mr. H. Day (Southwark, Central—Lab.) on March 9 asked the Minister of Transport whether, in view of the fact that there were over 1,800,000 unemployed, he would state what steps were being taken to expedite the speeding up of work necessary for the transmission and development of the ordinary electrical programmes and the electrification of railway lines, with a view to reducing the unemployment figures.

Dr. Leslie Burgin: I am satisfied that the electrical industry continues to expand progressively and that the railway companies are proceeding expeditiously with the various schemes of electrification which they have in hand. I have no power to require works of electrical development to be undertaken.

Level Crossings on Trunk Roads

Mr. R. De la Bere (Worcester, Evesham—C.) on March 11 asked the Minister of Transport whether he could now make a statement as to the progress made regarding the schemes to avoid level-crossings on trunk roads.

Dr. Leslie Burgin (Minister of Transport): Actual constructional work is in progress for the elimination of four level crossings on trunk roads. The arrangements for dealing with four other cases are in an advanced state of preparation, while in twelve further cases the necessary preparatory work has been commenced.

Railway Tunnels as Air Raid Shelters

Mr. Robert Gibson (Greenock—Lab.) on March 15 asked the Secretary of State for Scotland if he could now state the length of railway tunnelling inside and just outside Greenock; and if the regional inspector of the air-raid precautions department would recommend to the local authority the advisability of making use of such tunnelling for the protection of the population in the event of an air-raid alarm being given.

Mr. W. Elliot (Secretary of State for Scotland): I am informed that there are nine railway tunnels inside and just outside Greenock, the total length being about 2½ miles. As regards the second part of the question I cannot add anything to the reply which I gave to Mr. Gibson's question on the 4th inst.

Mr. Gibson: Does not the Minister consider the tunnelling offers the least possible protection in the case of an air raid?

Mr. Elliot: As I said in the previous answer, I can add nothing until the Local Authorities have considered the whole question whether the provision of such shelters for the public may be necessary or not. We must not interfere here with the discretion of the local authorities on every occasion.

Free Railway Warrants for Naval Boys

Mr. H. Parker (Romford—Lab.) on March 16 asked the First Lord of the Admiralty whether he would consider the issue of free railway warrants to naval boys when proceeding on long leave, as had recently been decided for the Army, in view of the distance of many of their homes from the training establishments and ships and the comparatively large expense of railway fares from the pay of boys.

Colonel J. J. Llewellin (Civil Lord of the Admiralty): I intend to make an announcement on the subject during the discussion on the Naval Estimates tomorrow.

London-Edinburgh in 6 Hours with Two Stops

On Monday, March 7, the revision of the down journey schedule of the L.N.E.R. Coronation streamline express, whereby a stop is made at Newcastle in addition to that at York, but without addition to the 6-hr. schedule, was brought into operation. The load was about 290 tons gross, the engine Class "A4" Pacific No. 4497, *Golden Plover*. The run to York was entirely free from out-of-course checks, and after a somewhat slower start than usual to Hatfield, taking 20 min. 7 sec. for the 17·7 miles, some very fast running was made; for the 58·3 miles from Hatfield to Fletton junction, Peterborough, the average was 81·2 m.p.h., with maxima of 92 m.p.h. at Three Counties, 90 at Biggleswade, 90 immediately prior to slowing to 70 over Offord curves, and 90 at Holme. After the usual severe slack through Peterborough, the 15·3 miles from Tallington to Stoke Summit were surmounted at an average of 73·7 m.p.h., with a minimum of 71 m.p.h. on the 1 in 178, and 88 m.p.h. was reached before slowing through Grantham. The 72·9 miles from Stoke summit to Brayton junction, Selby, were covered at an average of 77 m.p.h., including slacks at Grantham, Hougham, Muskham troughs, Retford (58 m.p.h.), Scrooby troughs, and Doncaster, mostly to about 70 m.p.h. Peterborough, 76·4 miles, was passed in 64 min. 19 sec., Grantham, 105·5 miles, in 89 min. 18 sec., Doncaster, 156·0 miles, in 129 min. 15 sec., and Selby, 174·4 miles, in 143 min. 19 sec., ¾-min. early; owing to a very slow approach to York, the King's Cross-York time, for the 188·2 miles, was 157 min. 50 sec., start-to-stop. Booked time is 157 min.

Leaving York on time, the withdrawal of any limitation of speed thence to Darlington, by reason of the four-aspect signalling now installed, made it an easy matter to gain sufficient time to cover the additional Newcastle stop. Darlington, 44·1 miles from York, was passed in 37 min. 54 sec., with no higher speed than 83½ at Croft Spa; the average over the 31·8 miles from Tollerton to Croft Spa was 76·3 m.p.h., including a 68 m.p.h. slack over Wiske Moor troughs. Slacks were made to 67 m.p.h. at Darlington, 60 at Aycliffe, 35 at Browney Colliery, 32 at Durham, 32 at Plawsworth (pitfall), 45 at Lamesley, and 20 at King Edward Bridge junction, and Newcastle, 80·1 miles from York was reached in 77 min. 25 sec. after an extremely slow approach. From Newcastle to Edinburgh two severe permanent way relaying checks, one near Acklington and one at East Linton cost respectively 3½ and 3 min.; in addition over a minute was dropped by excessive caution from Tweedmouth to Berwick, where speed was kept for over a mile at 30 m.p.h. The arrival at Edinburgh, however, was only 2 min. 25 sec. late, after maximum speeds of 92 m.p.h. at Beal and 87 at Prestonpans. With an unchecked run and normal speed through Berwick (66·9 miles, passed in 65 min. 25 sec.) the 124·4 miles from Newcastle to Edinburgh would have been covered in about 114½ min., at 5½ min. inside schedule. The 20·5 miles from Christon Bank to Scremerston were covered in 14 min. 45 sec., at an average of 83·4 m.p.h.

It may be observed that, apart from out-of-course checks, service speed restrictions required one slack to 20 m.p.h., seven between 25 and 35 m.p.h., two between 36 and 45 m.p.h., two between 46 and 55 m.p.h., five between 56 and 65 m.p.h., and eleven between 66 and 75 m.p.h., in many cases from high preceding speeds. The foregoing times and speeds were recorded by Mr. Cecil J. Allen.

NOTES AND NEWS

Electrification in Spain.—According to a telegraphed report received by the Spanish Press Services Limited, electric traction on the line from Victoria to Mecolalde, which was recently electrified, has been formally inaugurated by General Lopez Pinto.

New Maritime Station at Algiers.—The first stone of the new maritime station at Algiers has been laid opposite the Town Casino, according to Reuters. This marks the beginning of a scheme for three adjacent stations, one for shipping, one for railway, and one for motorcoaches. The new maritime station will be built on a mole about 300 yd. long, on each side of which two liners will be able to draw in.

Southern Railway Train Fire.—As the 11.47 a.m. train from Minster to London *via* Dover and Maidstone was running between Swanley Junction and St. Mary Cray on March 10, two coaches caught fire. The train was stopped, some of the passengers walked through the corridors to adjoining coaches while others descended on to the line. The burning coaches were uncoupled and placed in a neighbouring siding where they were completely gutted.

Floods on the Central Australia Railway.—Abnormal rainfall has caused extensive damage to the Central Australia Railway between Oonadatta and Alice Springs, the latter having been isolated for over a week. One train was marooned and its passengers and staff have been supplied with food by aeroplane from Darwin. Repairs to the line are in hand, and the gangs are reported to be working in some places in 3 ft. of water. Communication by wireless has been maintained with the various isolated stations.

L.N.E.R. Boxing Championships.—R. Wynn (Liverpool Street) won the welter-weight and middle-weight events in the L.N.E.R. boxing championships held at the Stadium Club, High Holborn, London, on March 16. There were 23 competitors, producing many keen and exciting bouts, out of an entry of 35. The Southern Area was the winner in the inter-area competition. Col. H. H. Mauldin, Superintendent (Eastern Section), Southern Area, presided; and Sir Murrough J. Wilson, Deputy-Chairman of the L.N.E.R., presented the cups and medals.

Southampton Port Traffic.—Southampton's outstanding position as a port for ocean-going passengers was enhanced in 1937, according to the Board of Trade statistics just published. Actually, it was the only big passenger port to increase its share of the total traffic. Of the total number of passengers to and from places outside Europe, 47 per cent. were recorded at Southampton, 18 per cent. at London, and 16 per cent. at Liverpool, as compared with the previous year's percentages of 46, 20, and 16 respectively. In 1937 nearly 70 per cent. of the whole of the passenger traffic passing by sea between the United Kingdom and the Continent was dealt with at the four ports of Dover, Folkestone, Newhaven, and Southampton.

Drogheda Quays Railway Extension.—On March 10, the board of the Drogheda Harbour Commissioners adopted a resolution put by its Chairman—who is also Mayor of Drogheda—that legal steps should be taken for the extension of the railway to the quays at a cost of about £6,000. A Bill in the Dail will be necessary.

Sutton Model Railway Show.—The Sutton District Model Railway and Engineering Club recently held its second annual exhibition. Railway exhibits totalled about 50 per cent. of the 500 entries, and secured the premier award, Mr. H. B. Turner's HO-gauge model of a Southern Railway locomotive "Lord Nelson" class winning the Sir Malcolm Campbell Cup. A signal demonstration set with a minute lock and block apparatus in the signal box which functioned perfectly, and a passenger-carrying railway, were popular features.

Current Failure on London Transport Tube Lines.—The earthing of a cable supplying current from the Charing Cross substation brought some 20 trains to a standstill on the Bakerloo and Morden-Edgware tube lines of London Transport at about 7.0 a.m. on March 15. Traffic was suspended between Piccadilly and Elephant & Castle stations (Bakerloo); and between Kennington and Strand stations (Morden-Edgware Line). An emergency service of buses between Elephant & Castle and the Strand was instituted within 25 min. of the failure. Normal running on all lines was restored by 2 p.m.

Disappointing U.S. Freight Rate Decision.—A Reuters message from New York states that the decision of the Interstate Commerce Commission, referred to in these columns of our issue of March 11, is regarded as disappointing in railroad quarters, where it is estimated that the additional annual revenue will amount to only $175,000,000, instead of over $400,000,000 applied for. Wall Street's attention is now focused on President Roosevelt's forthcoming railroad conference, which, it is hoped, may bring constructive action into the railway field. Spokesmen of the big railway companies met in Washington on Friday last to consider the drafting of a comprehensive legislative programme to aid the railroads.

Exploitation of North China to be Controlled by Army Commission.—A Reuters message from Tokio, states Mr. Hachisaburo Hirao, Chairman of the Japan Iron Manufacturing Company and a former Minister of Education, has left Tokio for Peiping to assume the Chairmanship of the Japanese Army's Economic Commission in North China. The commission will have control of the North China Economic Development Company, which is being organised to exploit the country's resources. Before his departure Mr. Hirao said that rehabilitation of the railways would claim his close attention.

Northern Ireland Transport Inquiry.—The Northern Ireland Cabinet has decided that in addition to the private technical and financial investigation of the working of the Road & Rail Transport Act to be made by a commission of inquiry (see our issues of February 18 and March 4), a public inquiry will also be held by the Minister of Home Affairs. Every interest involved in road and rail transport will have the opportunity of giving evidence at this public inquiry, and no decision will be taken by the Government until both inquiries are concluded. The desirability of a public inquiry was emphasised in a statement issued by the Road Board on March 14.

Road Accidents.—The Ministry of Transport returns for February of persons killed or injured in road accidents is as below. The figures in brackets are those for the corresponding period of last year:—

	Killed		Injured	
England				
Pedestrians	218	(220)	4,564	(4,785)
Others ...	177	(185)	7,426	(7,149)
Wales				
Pedestrians	11	(6)	185	(188)
Others ...	10	(6)	281	(283)
Scotland				
Pedestrians	27	(37)	532	(525)
Others ...	19	(8)	571	(561)
	462	(462)	13,559	(13,491)

The total fatalities for the preceding month were 521, compared with 521 in the corresponding period of 1937.

Collision on the Underground.—Colonel A. H. C. Trench on Wednesday inquired on behalf of the Minister of Transport into the accident of March 10 on the Northern Line (Morden-Edgware) of the London Passenger Transport Board, when a northbound train, travelling between Waterloo and Charing Cross, collided with the rear of the train in front, causing slight injuries to 12 passengers. On account of a signal failure northbound trains were travelling under caution and the impact therefore was slight. Traffic on the line was seriously dislocated and was not restored to normal until late evening. At the inquiry, a signal linesman who had been called to attend to the failure, admitted that the collision was the result of an error of judgment on his part.

L.M.S. (London) Golfing Society.—The eleventh annual dinner of this society was held at the Stephenson Rooms, Euston Hotel, on March 4, when a company of 86 members and guests assembled. Following an excellent dinner, a musical programme interspersed with interesting speeches, was provided, and the trophies competed for during 1937 were presented by the Captain of the society (Mr. Alex. Eddy) to the winners, as follow: Captain's prize, Mr. G. Weeds; "Stamp" chal-

lenge cup, Mr. F. E. Bailey ; " Roberts " challenge cup, Mr. N. Horner ; " Hunt " challenge cup, Mr. L. W. F. Noton ; " Gee " challenge cup, Mr. F. J. Finney ; " Irwin " challenge cup, Messrs. D. M. Dear and J. W. Melling ; " Reid " challenge cup, Mr. W. Aish. Among members present were :—

Messrs. A. F. Bound, H. J. Burcham, E. H. d'E. Darby, F. S. Darby, A. W. Donaldson, F. A. C. Leigh, C. N. Mansfield, G. Morton, H. V. Mosley, A. W. Norman, H. W. Phillips, R. A. Riddles, F. Roberts, H. E. Roberts, F. Smith, W. A. Stanier, S. J. Symes, E. Taylor, and W. Wood.

Visitors included Messrs. T. Anderson Davis (Verulam G.C.), L. W. F. Dawes and J. B. Elliot (Southern Railway), W. H. J. Powell (L.N.E.R.), F. Tipton (Thames Steam Tug and Lighterage Company), W. H. C. Clay, G. L. Darbyshire, A. Newlands, J. Shearman, W. E. Thornhill, and many others.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of December, 1937, amounted to $12,262,000, an increase of $9,000 in comparison with December, 1936. In the working expenses of $9,337,000 there was an increase of $625,000, leaving net earnings $616,000 lower at $2,925,000. Aggregate gross earnings for the 12 months of 1937 were $145,085,000, an improvement of $6,522,000, and the net earnings of $23,742,000 were higher by $431,000. In January this year gross receipts increased by $121,000 to $10,015,000, and working expenses were $477,000 higher at $9,758,000, leaving net earnings of $557,000, or a decrease of $35,600.

Canadian National Earnings.—Gross earnings of the Canadian National Railways for December, 1937, were $16,219,426, a decrease of $1,004,800 in comparison with December, 1936. In the working expenses of $14,490,340 there was an increase of $171,663, leaving net receipts $1,176,463 lower at $1,729,085. Aggregate gross earnings for the 12 months of 1937 were $198,396,609, an increase of $11,786,119, and the net earnings of $17,607,751 were higher by $2,474,951. In January this year gross earnings were $13,321,632, a decrease of $721,720, and operating expenses rose by $872,256 to $14,832,385, leaving net receipts $1,593,976 lower at $1,510,753.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 10th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,855¼ mls.)						
Passenger-train traffic...	394,000	393,000	+ 1,000	3,888,000	3,770,000	+ 118,000
Merchandise, &c. ...	504,000	495,000	+ 9,000	4,849,000	4,794,000	+ 55,000
Coal and coke ...	295,000	301,000	− 6,000	3,087,000	2,902,000	+ 185,000
Goods-train traffic ...	799,000	796,000	+ 3,000	7,936,000	7,696,000	+ 240,000
Total receipts	1,193,000	1,189,000	+ 4,000	11,824,000	11,466,000	+ 358,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic	264,000	262,000	+ 2,000	2,587,000	2 533,000	+ 54,000
Merchandise, &c. ...	353,000	347,000	+ 6,000	3,399,000	3,280,000	+ 119,000
Coal and coke ...	271,000	276,000	− 5,000	2,825,000	2,640,000	+ 185,000
Goods-train traffic ...	624,000	623,000	+ 1,000	6,224,000	5,920,000	+ 304,000
Total receipts	888,000	885,000	+ 3,000	8,811,000	8,453,000	+ 358,000
G.W.R. (3,737 mls.)						
Passenger-train traffic...	170,000	167,000	+ 3,000	1,624,000	1,596,000	+ 28,000
Merchandise, &c. ...	205,000	198,000	+ 7,000	1,977,000	1,895,000	+ 82,000
Coal and coke ...	123,000	121,000	+ 2,000	1,265,000	1,191,000	+ 74,000
Goods-train traffic ...	328,000	319,000	+ 9,000	3,242,000	3,086,000	+ 156,000
Total receipts	498,000	486,000	+ 12,000	4,866,000	4,682,000	+ 184,000
S.R. (2,147 mls.)						
Passenger-train traffic...	255,000	244,000	+ 11,000	2,576,000	2,503,000	+ 73,000
Merchandise, &c. ...	63,000	61,000	+ 2,000	584,500	579,500	+ 5,000
Coal and coke ...	38,000	37,000	+ 1,000	377,500	355,500	+ 22,000
Goods-train traffic ...	101,000	98,000	+ 3,000	962,000	935,000	+ 27,000
Total receipts	356,000	342,000	+ 14,000	3,538,000	3,438,000	+ 100,000
Liverpool Overhead ... (6½ mls.)	1,331	1,121	+ 210	13,524	11,767	+ 1,757
Mersey (4½ mls.) ...	4,105	3,957	+ 148	43,261	41,746	+ 1,515
*London Passenger Transport Board ...	568,200	548,600	+ 19,600	20,760,300	20,665,800	+ 94,500
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,669	1,565	+ 104	16,766	16,136	+ 630
,, ,, goods	469	568	− 99	4,376	4,922	− 546
,, ,, total	2,138	2,133	+ 5	21,142	21,058	+ 84
Great Northern pass. (543 mls.)	7,350	7,700	− 350	79,500	75,150	+ 4,350
,, ,, goods	9,000	9,850	− 850	84,150	89,300	− 5,150
,, ,, total	16,350	17,550	− 1,200	163,650	164,450	− 800
Great Southern pass. (2,076 mls.)	26,382	25,250	+ 1,132	276,792	264,208	+ 12,584
,, ,, goods	40,848	41,785	− 937	405,185	424,519	− 19,334
,, ,, total	67,230	67,035	+ 195	681,977	688,727	− 6,750

* 37th week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices Mar. 16, 1938	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	67⅝	55¾	53	−3
5% Con. Prefce. ...	127	108	113½	−2
5% Red. Pref. (1950)	113	109	108½	—
4% Deb.	113⅝	102½	106½	−1
4½% Deb. ...	118	106	108½	−2
4½% Deb.	124½	112	116½	−1
5% Deb.	136½	122¾	129½	—
2½% Deb. ...	76	64	67½	−1
5% Rt. Charge ...	133 7/16	118	126½	—
5% Cons. Guar. ...	133¾	116½	124½	−1
L.M.S.R.				
Ord.	36⅛	25⅜	19	−2½
4% Prefce. (1923)	82½	65¾	55	−3½
4% Prefce. ...	92½	77¾	73	−3
5% Red. Pref. (1955)	107¾	102	102	—
4% Deb.	108	99¼	101	−½
5% Red. Deb. (1952)	117½	111	113½	—
4% Guar. ...	104	95⅞	97½	−1½
L.N.E.R.				
5% Pref. Ord. ...	12½	6¾	5½	−1
Def. Ord.	6¼	3⅝	2¾	−⅝
4% First Prefce.	79½	63	55	−3½
4% Second Prefce.	31½	21	20	−1
5% Red. Pref. (1955)	101¼	89¾	89½	−2
4% First Guar. ...	103	91⅞	93	−1½
4% Second Guar.	97⅝	85½	84	−2
3% Deb.	84⅛	74	73½	−1½
4% Deb.	107¼	98½	99	−1½
5% Red. Deb. (1947)	113½	106½	110½	—
4½% Sinking Fund Red. Deb.	110 5/16	105½	107	—
SOUTHERN				
Pref. Ord.... ...	98⅝	83½	73½	−3
Def. Ord.	27⅞	16¾	18	−1¾
5% Pref.	126 1/16	105 13/16	112½	−1
5% Red. Pref. (1964)	118	110¼	113½	—
5% Guar. Prefce.	133¾	116¾	125	—
5% Red. Guar. Pref. (1957)	118½	111½	114	—
4% Deb.	112	101¼	104½	−1
5% Deb.	135¾	123½	127½	—
4% Red. Deb. 1962–67	113	105	107	—
BELFAST & C.D.				
Ord.	5	4	4½	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar. ...	105¾	99	100½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	5⅝	+⅛
G. SOUTHERN (IRELAND)				
Ord.	50	21½	20	−3
Prefce.	61	34	30	—
Guar.	94¾	69½	58	−9¼
Deb.	95	82⅛	80	+1
L.P.T.B.				
4½% "A" ...	123¾	110½	118½	—
5% "A" ...	135	121½	128½	—
4½% "T.F.A." ...	108¾	104	106	—
5% "B" ...	125	114½	121½	—
"C"	99¾	75	81½	−2
MERSEY				
Ord.	42⅜	22	21	−2
4% Perp. Deb. ...	103	96¾	100	—
3% Perp. Deb. ...	77⅝	74½	74½	—
3% Perp. Prefce.	68¾	61¼	62	−1

CONTRACTS AND TENDERS

Wagons for India

S. A. Metallurgique D'Enghien-St. Eloi has received orders from the Mysore State Railway Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for 15 MBCX type metre-gauge bogie covered goods wagons, 43 ft. long over headstocks and 7 ft. 6 in. wide inside body; 17 MOX type metre-gauge four-wheeled open goods wagons, 21 ft. 6 in. long over headstocks and 7 ft. 6 in. wide inside body; and three metre-gauge, 12 ft.-wheelbase, four-wheeled timber trucks, 21 ft. 6 in. long over headstocks and 7 ft. 6 in. wide. All these wagons are to be supplied complete with vacuum and hand brake gear and wheels and axles.

La Brugeoise et Nicaise & Delcuve has received an order from the Assam Bengal Railway Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for 23 MC type metre-gauge underframes of which four are for covered motor-vans, one for brake and baggage van, and 18 for wooden covered wagons. The underframes are to be supplied complete with vacuum and hand brake gear and wheels and axles.

The Quasi Arc Co. Ltd. has received an order for two single-operator diesel-engined welding sets from the Buenos Ayres Great Southern Railway.

Alcock, Ashdown & Co. Ltd., has received orders from the Indian Stores Department, for a quantity of acute crossings and switches.

The directors of the Great Western Railway have authorised the placing of the following contracts :—

Motor Services (London) Limited : Two second-hand Commer box vans.

Taskers of Andover (1932) Limited : Three articulated pole trailers.

Wilson Lovatt & Sons Ltd : Construction of an additional warehouse at Brentford Dock.

R. A. Lister & Co. Ltd. : Two Lister "C.S." auto trucks.

Latil Industrial Vehicles Limited : Two Latil tractors.

The Everseal Products Limited : Repairs to roof of the old stationery stores, Royal Oak, Paddington.

Walter Macfarlane & Co. Ltd. : Supply and fixing of a spiral staircase in the goods yard, Hockley.

A. Herbert Limited : Provision of a Graffenstaden vertical milling machine for Stafford Road Works, Wolverhampton.

For Swindon Works :—

Loudon Bros. Limited : Wheel lathe for "AW" (Wheel) Shop.

Churchill Machine Tool Co. Ltd. : Axle journal grinding machine for No. 16 (Wheel) Shop.

Soag Machine Tools Limited : Soag standard hexagon turret lathe for No. 15 (Fitting) Shop.

Bennis Combustion Limited : Supply and erection of a forced-draught stoker for Lancashire boiler in No. 24 (Carriage) Shop.

Churchill Machine Tool Co. Ltd. : Hydraulic grinding machine for "O" (Tool) Shop.

At the Company's Docks :—

Overhaul of the following vessels :—

Penarth, Pontoon, Slipway & Ship Repairing Co. Ltd. : SS. *St. Andrew*, Fishguard; SS. *Great Western*, Fishguard; floating crane, *Simpson III*, Cardiff; grab-barge, Barry.

Harland & Wolff Limited : SS. *Roebuck*, Weymouth.

Willoughby (Plymouth) Limited : SS. *Sir Francis Drake*, Plymouth.

Port Talbot Dry Dock Co. Ltd. : Dredger *David Davies*, Swansea.

Webster & Bennett Limited has received an order from the Buenos Ayres Great Southern Railway for one motor-driven boring and turning mill.

Railcar for Peru

D. Wickham & Co. Ltd. has received an order from the Central Railway of Peru, for one 4 ft. 8½ in.-gauge double power bogie, 50-seater railcar, to be fitted with a supercharged, petrol-driven, 12-cylinder Lincoln engine and Mylius four-speed gearbox. The railcar is to be supplied to the inspection of Messrs. Livesey & Henderson.

The Bengal-Nagpur Railway Administration has placed the following orders :

Henry Pels & Co. Ltd. : One combination plate splitting, shearing, and punching machine.

John Walsh & Co. (Birmingham) Ltd. : 3,700 planished steel panel plates.

Steel Co. of Scotland Limited : 1,000 carriage and wagon tyres.

Brown Bayley's Steel Works Limited : 1,000 carriage and wagon tyres.

Alfred Herbert (India) Limited has received an order from the Controller of Stores, Great Indian Peninsula Railway, Lower Parel, Bombay, for the supply of 245 cwt. of copper rods.

The Skefko Ball Bearing Co. Ltd. has received a contract from the Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, for the supply of a quantity of ball bearings of various sizes, including bearings required for carriage and ceiling fans, train lighting dynamos, and head lighting generators.

Churchill Machine Tool Co. Ltd. has received an order from the Buenos Ayres Great Southern Railway for one motor-driven piston ring and surface-grinding machine.

Leyland Motors Limited has received an order from the London Passenger Transport Board for 87 flat-engined coach chassis of a new type similar to the sample coach which has been operating experimentally on the Green Line service during the last seven months. This type incorporates a Leyland oil-engined unit positioned on its side behind the offside front wheel.

Leyland Motors Limited has also received orders from Central S.M.T. Co. Ltd. for twelve oil-engined, and from Wilts & Dorset Motor Services Limited for four oil-engined, Titan passenger vehicles.

The Swedish State Railways Administration has limited its purchase of coal to about three months' requirements, buying about 92,000 tons for delivery during the period between April 1 and June 30, says Reuters Trade Service from Stockholm. All the coal bought is English, the brands being Maude, Broomhill, Lambton, South Hetton, Horden, and Whitehaven. The prices vary from 19s. 10½d. to 26s. 2d.

Robert Stephenson & Hawthorns Limited has received an order from the Cordoba Central Railway for four steel fireboxes for locomotives.

The directors of the Great Western Railway announce the following bridge and other works to be put in hand :—

BRIDGE RECONSTRUCTIONS

The bridge carrying the Berks & Hants line over Holy Brook, near Theale.

The bridge carrying the public road over the Moat Lane to Talyllyn line, near Moat Lane.

A portion of the bridge carrying a footway over the Treherbert branch, near Tonypandy.

The floor plating to the road portion of Ashton Swing Bridge, Bristol; the under-side of the structure is also to be painted.

WORKS AT STATIONS AND DEPOTS

Paddington station.—Complete renewal of the glazing of the main roof span over Platforms Nos. 1 and 2 is necessary, and this will be effected to an improved design which will render efficient maintenance less difficult and less costly.

Bristol (Temple Meads) station.—The main roof of this station was constructed about 1870 and is now in need of general repairs, which will be carried out in conjunction with painting.

Cardiff (Swansea Street Sidings).—To facilitate working and at the same time enable economies to be effected, the "hump" at these sidings, now disused, will be levelled and the layout improved.

Baschurch.—Owing to the sharp curves now existing at this place there is a risk of long vehicles becoming buffer-locked, and to obviate this, curves leading from the down main line to the sidings will be improved.

Montgomery.—A new warehouse is to be provided here for the use of the Montgomery Farmers' Association.

Leamington Spa.—To improve the means of communication and facilitate the working of the station, it is proposed to provide a telephone switchboard and re-arrange the telephones.

Llantwit Major.—The existing cart weigh-bridge is incapable of weighing the motor vehicles using the station today, and a new 20-ton machine is to be provided.

Tynycwm.—To give access from a housing estate on the down side of the line and enable an occupation crossing, of which undesirable use is being made, to be closed, the footbridge at Tynycwm Halt is to be extended.

Gloucester, New Yard.—Sidings are to be re-arranged to enable crippled wagons to be dealt with without having to cross the traffic sidings.

Tenders are invited by the Bengal & North Western Railway, receivable by April 5 at 237, Gresham House, Old Broad Street, London, E.C.2, for the supply of five boilers for "P" class locomotives.

Tenders are invited by the Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, receivable by April 4, for the supply of quantities of locomotive, carriage, and wagon axles and tyres required for the Eastern Bengal Railway.

Tenders are invited by the Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, receivable by April 6, for the supply of buffers and buffer parts required for the Eastern Bengal and Great Indian Peninsula Railways.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, invites tenders, receivable by April 4, for the supply of steel spiral, volute, and helical springs required for the North Western, Great Indian Peninsula, and Eastern Bengal Railways.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, invites tenders, receivable by April 8, for the supply of quantities of axle boxes required for the North Western, Great Indian Peninsula, and Eastern Bengal Railways.

XUM

OFFICIAL NOTICES

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS

APPLICATIONS from qualified candidates are invited for the following post :—

JUNIOR DRAUGHTSMAN

required by the Kenya and Uganda Railways and Harbours for one tour of 24-48 months, with possible permanency. Salary £390-£18-£480 a year. Free passages and quarters and leave on full salary. Candidates, aged 23-30, must possess a sound knowledge of modern carriage and wagon design and construction, including modern welded steel carriage and wagon practice, and in addition have had workshops experience. They should hold the Higher National Certificate (Mechanical Engineering) or an equivalent qualification; and a knowledge of railcar body design would be an advantage.

Apply at once by letter, stating age, whether married or single and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/5757.

REQUIRED.—Temporary Draughtsman in Railway Engineer's Office in London. Applicants must be fully qualified in British Railway Signalling practice, Mechanical and Electrical, experienced in Interlocking and design of Electric Signalling Circuits. Salary will depend on qualifications and experience. —Reply Box No. 113, THE RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

THE proprietors of the following British Patents desire to introduce their inventions to the notice of manufacturers and others with a view to the inventions being worked commercially under licence or otherwise. All communications to be addressed to Jensen & Son, Chartered Patent Agents, 77, Chancery Lane, London, W.C.2.

No. 421016 Improvements in railway axle journal lubricators.

No. 421712 Improvements in railway carriage axle boxes.

London & North Eastern Railway Company

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the warrants for Interest payable on the 16th April, 1938, on the Company's 5 per cent. Redeemable Debenture Stock, the balance will be struck as at the close of business on 28th March, and such Interest will be payable only to those stockholders whose names are registered on that date.

Transfers of the 5 per cent. Redeemable Debenture Stock should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5.0 p.m. on 28th March.

By Order,
P. J. DOWSETT,
Secretary.

Marylebone Station,
London, N.W.1.
18th March, 1938.

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—

16 LOCOMOTIVE TANK ENGINES, 2-6-4 Type "ST" Class (Superheated) Metre Gauge.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company Limited, marked "Tender for Locomotives," with the name of the firm tendering, must be left with the undersigned not later than 12 Noon on Thursday, the 14th April, 1938.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of £2 for each copy of the Specification.

Copies of the drawings may be obtained at the offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
16th March, 1938.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

RAILWAY AND OTHER REPORTS

Emu Bay Railway Co. Ltd.—The accounts for the year ended December 31, 1937, show that £11,781 sterling is available for payment of interest on the 4½ per cent. irredeemable debenture stock, being interest for the year ended December 31 last and one year's arrears of interest. Payment will be made on April 1 next.

East Kent Light Railways Company.—Net revenue for 1937 amounted to £3,353, comparing with £3,374 for 1936. The sum of £850 (against £800) is appropriated to income tax, and 2 per cent., absorbing £2,540, is allocated to discharge of liability for debenture interest in respect of 1937 under a scheme. The amount to be carried forward is £25, against £62 brought in.

La Guaira & Caracas Railway Co. Ltd.—The company is making a payment of 1¼ per cent. on account of arrears of interest for the six months ended September 1, 1933, on its 5 per cent. debenture stock, together with interest thereon to date at the rate of 5 per cent. per annum, amounting to 5s. 7·911d. per cent., making a total payment of £1 10s. 7·911d. per cent. less income tax at 5s. in the £. Warrants were posted on March 10.

Canadian Pacific Railway Company.—The accounts for the year ended December 31, 1937, show, after deducting depreciation and fixed charges, a balance of income account transferred to profit and loss of $9,462,284, an improvement of $3,433,100 over the previous year. Gross earnings for the year show an increase of $6,522,795; working expenses (including taxes) an increase of $6,091,659, and net earnings from railway operations an increase of $431,136. Other income, after provision for depreciation of steamships and hotels, increased $4,998,340, and fixed charges increased $128,236. Owing to the filing on December 31 last by the Minneapolis, St. Paul and Sault Ste. Marie Railway Company of a petition for reorganisation under the Bankruptcy Act of the United States, interest amounting to $1,868,140 on certain bonds of that company guaranteed as to interest by the Canadian Pacific and on notes secured by such bonds became payable by the Canadian Pacific and has been deducted from income account. Gross earnings amounted to $145,085,558, working expenses (including taxes) to $121,343,311, and net earnings to $23,742,247. Other income (after providing for depreciation of steamships and hotels) reached the figure of $11,629,711, leaving $35,371,958 as the income available for fixed charges, which amounted to $24,041,534.

West Yorkshire Road Car Co. Ltd.—This company, which is controlled jointly by the L.N.E.R. and L.M.S.R. Companies and Tilling & British Automobile Traction Limited, secured in the year 1937 a net profit, after deducting charges for fuel taxation and vehicle licences, directors' fees and remuneration, and appropriations to income tax and depreciation reserves, of £80,607, compared with £73,794 for 1936. Adding £12,768 brought forward gives a total of £93,375, compared with £86,517 for 1936. The dividend on the 6½ per cent. preference shares takes £13,000, and the 10 per cent. dividend (5 per cent. interim and 5 per cent. final) on the ordinary shares takes £67,500, leaving £12,875 to be carried forward. During the year the issued capital was increased to £875,000 by the allotment of 67,500 ordinary shares of £1 each. Omnibus stations at Bradford and Leeds have been completed, and an omnibus station at Harrogate is in course of erection. An investment has been made in Otley Omnibus Stations Limited, a subsidiary company formed during the year. Further small omnibus businesses have been acquired.

John Baker & Bessemer Limited.—A dividend is recommended of 7½ per cent., against 5 per cent.

John I. Thornycroft & Co. Ltd.—The board has decided to pay this month (March) 18 per cent. on the 6 per cent. cumulative preference shares, being the balance of dividend accrued to June 30, 1937. This payment was foreshadowed last November, when 18 per cent. was paid, being the dividend accrued to June 30, 1934.

British Insulated Cables Limited.—For the year 1937 the profits were £821,358, comparing with £765,695 for the previous year. The amount allowed for depreciation is £143,091, and the sum of £100,000 is again allocated to reserve. The rate of dividend and bonus is maintained at 20 per cent., but it is now to be paid on a capital increased by the 20 per cent. scrip bonus paid twelve months ago. The carry forward is raised from £380,879 to £446,992.

Coventry Machine Tool Works Limited.—Net profits of this company for the year 1937—its first year as a public company—amounted to £14,389. After transferring £1,439 to capital reserve, representing profit for the period prior to the date of incorporation (February 17, 1937), less tax, and after deduction of £4,300 for income tax and N.D.C., the balance available for distribution is £8,650. A dividend of 8 per cent. is recommended, absorbing £6,000, and after transferring £507 to development reserve (making with £493 transferred from capital reserve a total reserve of £1,000), the carry-forward amounts to £3,143.

XUM

Railway Share Market

The tension in European politics, coupled with expansion of rearmament and growing fears of either an increase in income tax or N.D.C. payments, have led to liquidation in all sections of the Stock Exchange this week. The lower prices failed to attract buyers as there is a general disposition to await the Budget and further developments in European affairs.

Home railway securities have not moved against the general trend, and owing to market conditions the junior stocks have declined sharply. Debenture and prior charges were also reactionary in tendency in sympathy with British Government stocks. The past week's traffics were regarded in the market as disappointing, although the remarks at the recent L.M.S.R. meeting have induced rather more confidence that, granted there is no serious trade set-back, there are reasonable prospects of dividends on the junior stocks being maintained. Southern deferred has moved down to 18½, but was a relatively steady feature, partly because the past week's receipts were viewed satisfactorily. The deferred stock represents a fairly moderate proportion of the company's total capital. Consequently, dividend prospects are affected a good deal by only a comparatively small rise or fall in net revenue, and the tendency, when markets are normal, is for the price to move fairly closely with the weekly traffics. The preferred ordinary stock has gone back to 74¾. Great Western ordinary was influenced to some extent by news of less activity in the Welsh tinplate trade, and the price has now declined to 54½ owing to the market conditions now prevailing. On the basis of last year's 4 per cent. dividend the yield works out at over 7¼ per cent. L.M.S.R. is now 19⅝ at which the yield is fully 7½ per cent., while the 4 per cent. preference and 4 per cent. 1923 preference are 73½ and 56 respectively. L.N.E.R. first preference transferred down to 55 at one time and the second preference down to 19½, while the 4 per cent. first guaranteed and 4 per cent. second guaranteed stocks were lower at 94 and 85 respectively. London Transport "C" was lower at 81.

Argentine railway issues were lowered sharply, including the debenture stocks of the leading companies, although no heavy selling was reported. The marking down of prices was attributed largely to a precautionary measure on the part of dealers who do not wish to have a substantial amount of stock on their hands with markets in their present condition. Elsewhere, San Paulo reacted to under 50. Canadian Pacific ordinary and preference were inclined to improve subsequently in sympathy with American railroad stocks.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937-38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: Mar. 16, 1938	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	13.3.38	17,960	— 2,600	11	173,420	174,350	— 930	Ord. Stk.	29	10¼	10	Nil
	Argentine North Eastern	753	12.3.38	7,531	+ 354	37	340,448	322,715	+ 17,733	,,	19¼	6	3	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	75	5
	Bolivar	174	Feb., 1938	3,500	— 2,200	9	7,100	11,100	— 4,000	6 p.c. Deb.	9½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	6½	7⅛
	Buenos Ayres & Pacific	2,806	12.3.38	111,663	— 13,647	37	3,182,696	3,285,713	— 103,017	Ord. Stk.	17⅛	5½	4½	Nil
	Buenos Ayres Central	190	26.2.38	$88,000	— $69,200	35	$4,236,600	$5,014,100	— $777,500	Mt. Deb.	41½	18	11½	Nil
	Buenos Ayres Gt. Southern	5,084	12.3.38	199,007	— 6,948	37	5,503,968	5,413,169	+ 90,799	Ord. Stk.	33¾	13½	10	Nil
	Buenos Ayres Western	1,930	12.3.38	47,643	— 7,878	37	1,681,390	1,773,526	— 92,136	,,	31¾	11¼	8	Nil
	Central Argentine	3,700	12.3.38	107,255	— 74,091	37	4,584,974	5,599,506	— 1,014,532	,,	34¼	10¾	8	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	20½	4½	5½	Nil
	Cent. Uruguay of M. Video	980	5.3.38	20,243	+ 1,804	36	639,415	626,585	+ 12,830	Ord. Stk.	67/32	2	2½	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	Ord. Inc.	6¼	1½	1½	Nil
	Costa Rica	188	Dec., 1937	31,844	+ 12,491	26	155,206	110,934	+ 44,272	Stk.	38	27	27½	7¼
	Dorada	70	Feb., 1938	14,700	— 1,100	9	32,400	31,100	+ 1,300	1 Mt. Db.	107	106	106	5⅝
	Entre Rios	810	12.3.38	13,430	+ 2,059	37	534,430	483,589	+ 50,841	Ord. Stk.	19 7/16	6	5	Nil
	Great Western of Brazil	1,092	12.3.38	7,800	+ 500	11	92,200	94,000	— 1,800	Ord. Sh.	5/4	1/8	1/4	Nil
	International of Cl. Amer.	794	Jan., 1938	$487,142	— $26,797	5	$487,142	$513,939	— $26,797	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/-	1/-	1/2	Nil
	La Guaira & Caracas	22¾	Feb., 1938	4,970	+ 45	9	9,580	11,195	— 1,615	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	12.3.38	17,895	— 7,430	11	197,815	231,482	— 33,667	Ord. Stk.	9¼	3	2½	Nil
	Mexican	483	7.3.38	$322,600	+ $8,400	10	$2,948,100	$2,917,700	+ $30,400	,,	1½	1/4	1/8	Nil
	Midland of Uruguay	319	Feb., 1938	10,547	+ 2,059	35	75,858	69,474	+ 6,384	,,	1⅞	1/2	1/2	Nil
	Nitrate	384	28.2.38	6,579	— 2,382	9	41,326	29,791	+ 1,535	Ord. Sh.	3 1/16	2	2	Nil
	Paraguay Central	274	12.3.38	$2,956,000	— $180,000	37	$115,076,000	$98,690,000	+ $16,386,000	Pr. Li. Stk.	84	79¼	72½	8¼
	Peruvian Corporation	1,059	Feb., 1938	72,537	— 1,764	35	660,322	644,887	+ 15,435	Pref.	14⅝	4½	4	Nil
	Salvador	100	5.3.38	¢31,000	— ¢12,000	36	¢709,625	¢772,258	— ¢62,633	Pr. Li. Db	23½	21½	22½	Nil
	San Paulo	153½	6.3.38	25,850	— 8,172	10	274,150	286,232	— 12,082	Ord. Stk.	98½	56	50½	9⅞
	Taltal	160	Feb., 1938	1,840	— 1,600	35	30,670	27,930	+ 2,740	Ord. Sh.	1 7/16	1 1/16	5/4	13 5/16
	United of Havana	1,353	12.3.38	56,061	— 10,883	37	850,089	864,383	— 14,294	Ord. Stk.	55⅛	51/32	21½	Nil
	Uruguay Northern	73	Feb., 1938	1,014	+ 138	35	7,434	8,492	— 1,058	Deb. Stk.	10	2	2	Nil
Canada	Canadian National	23,802	7.3.38	648,925	— 114,473	10	5,971,195	6,432,439	— 461,244	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	4 p.c.	—	—	—	—
	Grand Trunk	—	—	—	—	—	—	—	—	Perp. Dbs.	77	62½	65	6⅛
	Canadian Pacific	17,186	7.3.38	474,800	— 51,800	10	4,414,400	4,510,400	— 96,000	4 p.c. Gar.	101⅞	94½	99½	4
										Ord. Stk.	18	7¼	6	Nil
India†	Assam Bengal	1,329	20.2.38	39,097	— 296	48	1,241,523	1,198,773	+ 42,750	Ord. Stk.	86	73½	79	31 5/16
	Barsi Light	202	28.2.38	3,030	+ 390	49	127,432	105,157	+ 22,275	Ord. Sh.	66½	46	58	8⅝
	Bengal & North Western	2,107	20.2.38	78,797	— 15,110	20	1,094,301	1,142,441	— 48,140	Ord. Stk.	317	301	298½	6
	Bengal Dooars & Extension	161	28.2.38	2,733	+ 525	49	134,704	120,358	+ 14,346	,,	100	84	86 2/8	6 15/16
	Bengal-Nagpur	3,268	28.2.38	171,300	— 982	49	6,417,308	5,612,578	+ 804,730	,,	101	89	91½	4⅝
	Bombay, Baroda & Cl. India	3,072	10.3.38	294,825	— 3,975	50	8,373,975	8,349,075	+ 24,900	,,	113	110½	111½	5⅝
	Madras & Southern Mahratta	2,967	28.2.38	144,900	+ 30,518	49	5,057,079	5,035,808	+ 21,271	,,	110	105	105½	8 1/16
	Rohilkund & Kumaon	571	20.2.38	17,610	— 3,926	20	208,770	223,723	— 14,953	,,	314	302	303½	5 15/16
	South Indian	2,531¾	20.2.38	113,407	+ 6,516	48	3,730,827	3,574,141	+ 156,686	,,	103½	99½	101½	4 11/16
Various	Beira-Umtali	204	Jan., 1938	79,831	+ 17,093	18	356,561	268,806	+ 87,755	—	—	—	—	—
	Egyptian Delta	620	28.2.38	5,198	— 82	49	243,880	234,017	+ 9,863	Prf. Sh.	31/-	5/4	1/4	Nil
	Kenya & Uganda	1,625	Feb., 1938	248,923	— 25,925	9	522,477	569,087	— 46,610	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48⅛	43½	47½	8 11/16
	Midland of W. Australia	277	Jan., 1938	13,642	+ 828	31	97,976	94,867	+ 3,109	Inc. Deb.	98	93½	93½	4⅝
	Nigerian	1,900	29.1.38	61,647	— 12,281	44	2,388,379	2,034,155	+ 354,224	—	—	—	—	—
	Rhodesia	2,442	Jan., 1938	393,202	+ 68,276	18	1,710,441	1,365,254	+ 345,187	—	—	—	—	—
	South Africa	13,263	19.2.38	617,042	+ 18,575	47	30,003,217	28,458,419	+ 1,544,798	—	—	—	—	—
	Victoria	4,774	Dec., 1937	908,340	+ 18,053	26	—	—	—	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.

Diesel Railway Traction

Hydraulic Transmissions

THE present turbo types of partial hydraulic transmissions, with direct drive either through a fluid coupling or friction clutch in the upper speed range, have several advantages which are well-known, such as relatively low weight and first cost, simplicity, ease of control, and, as far as the purely hydraulic parts are concerned, low upkeep charges. It is true that in all types some form of mechanical drive to the axles is required, and not infrequently it is this part which causes most trouble. These hydraulic transmissions can have, under certain conditions, other advantages which are not so obvious. It is well-known that they can be easily adapted to multiple-unit control, and, provided it is recognised in the design stage, there is no reason why hydraulic transmission cars or sets should not be coupled in multiple-unit with diesel-electric vehicles. Braking also can be carried out by the hydraulic transmission, and it is possible that this may become a standard feature if the use of hydraulic drive continues. Actually, braking has been carried out in the driving converter, but experience seems to indicate that it will be necessary to incorporate a braking converter if this feature is desired, particularly if there are long or steep down grades, and thus relieve the transmission of undue stresses. If the extra converter is not fitted it means that some supplementary brake of one or other of the existing standard types must be introduced, and the converter partly emptied; thus some of the simplification is lost. The installation of the extra converter does not mean necessarily that there will be much additional complication, and judging from what little experience is available there is no evidence that an undue increase in upkeep charges will result.

The Great Western Programme

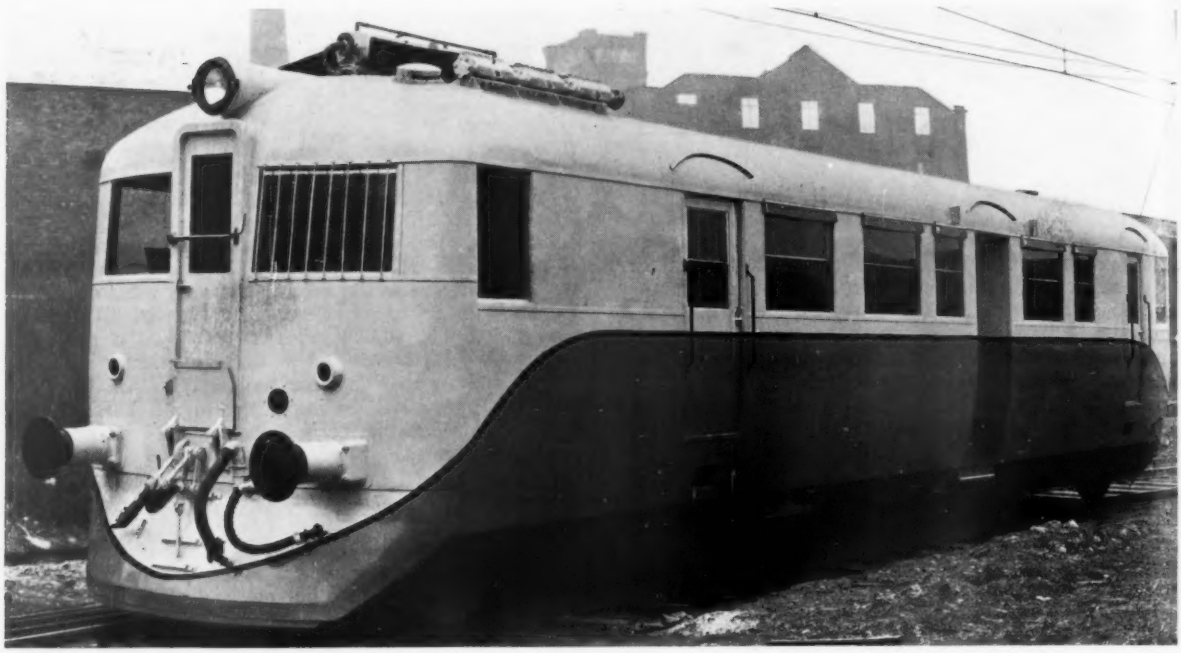
ONCE again it is to the Great Western Railway that a big advance in English diesel traction is due, for at the recent annual general meeting the Chairman, Viscount Horne, after referring to the success of the trailer-hauling car introduced last year, announced that the company intended to acquire 20 further diesel cars, and to that end they are in negotiation with the A.E.C., of Southall. Some of the new cars will probably be fitted out solely for parcels, mails, and light goods traffic. Another step forward is that some of the new cars will be expected to replace steam locomotives, whereas 17 of the 18 diesel cars now working on the G.W.R. system were built to provide supplementary services. This feature results from the increasing cost of steam locomotive operation coupled with the successful operation of the trailer-hauling car, No. 18, on the Lambourn Valley branch, where appreciable economies have been effected. The actual routes over which the 20 new cars will run has not yet been decided, but it is expected that local services will form the major part of the duties. It is almost exactly four years ago since the first Great Western diesel car was set to work on local services in the London area, and the 18 cars now cover nearly 1,000,000 miles a year over a great part of the G.W.R. system. The present vehicles are maintained and repaired by the builder, the A.E.C., under contract, and it will be interesting to see if this practice is followed when the stock is more than doubled by the new programme.

Standard Cars

THERE seems little reason at the present time why anyone should proceed along the most expensive lines to be found, but one still constantly observes neighbouring railways with similar characteristics using small numbers of cars to totally different designs, or railways bringing out with a flourish of trumpets diesel railcars or locomotives of peculiar design which appear to be intended only to prove (at this stage!) that diesel traction is no good, and that it is more steam locomotives that are wanted. Among saner folk, however, the appearance of the 108 Drewry cars for four different railways and two different gauges which embody standard power and transmission equipment and standard constructional features for six different seating layouts, will be hailed as an example of what can be done to cut down first cost while perpetuating a first class design and suitable performance characteristics. Similar features are to be found in the 34 Ganz cars built for the Argentine State Railways in 1936 and in the 42 trains and railcars now being delivered to the same line; in the French standard cars; and also in the batches of Fiat cars totalling well over 200 vehicles now at work in Italy. It may be merely a coincidence that all the firms mentioned above continue to get large orders, but at least no charge of stultifying progress by standardisation can be laid at their doors. Rather has the rate of technical progress been considerably accelerated thereby. Moreover, an examination of the design, as described in detail in this issue, shows that it should not be too hard to incorporate any improvements which experience in operation may show to be necessary. The excellence of the mechanical portion can be seen at a glance when considering the way welding has been used in the fabrication of the underframe and the bogie frame structure. Metal has been put in exactly where it was needed, and cut away where there was no stress. We believe that the design and methods adopted not only have given satisfaction in the case of the Argentine cars, but that they can be and are applicable to vehicles for other countries with both broad and narrow-gauge systems.

A HUNDRED RAILCARS FOR SOUTH AMERICA

Standardised construction has been applied to six different types of seating and to cars for two gauges while retaining an excellent mechanical design



One of the 108 *Drewry cars with multiple-unit control for Argentine railways*

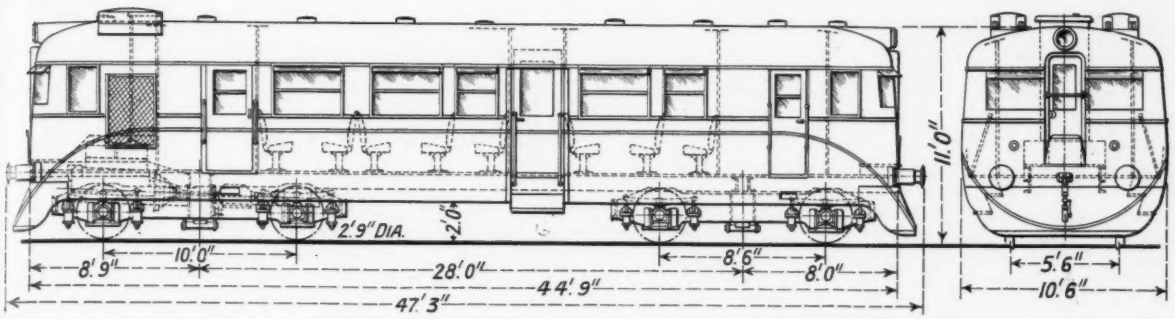
DELIVERY is now well under way of the 99 double-bogie diesel-mechanical railcars and one spare power bogie ordered from the Drewry Car Co. Ltd. by the Buenos Ayres Great Southern and Buenos Ayres Western Railways, and also of the eight cars for the Entre Rios and Argentine North Eastern Railways. These Drewry cars are all to the same general design, but the 99 vehicles are for 5 ft. 6 in. gauge lines, whereas the eight are for standard gauge tracks. All embody a 100-b.h.p. Gardner engine, a Vulcan-Sinclair fluid coupling, and a Wilson-Drewry four-speed gearbox mounted on one bogie; the second bogie is of the carrying type. Multiple-unit control is a feature. Driving positions are arranged at both ends of all cars, and a central door and hinged fall plate are fitted at each end of the body to enable the train staff to pass from end to end of two or three cars coupled in multiple-unit.

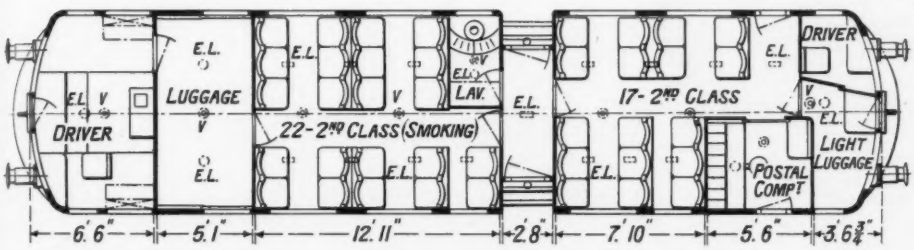
Five different body layouts are used in the 99 broad-gauge cars. In type "A" there are 39 second class seats, lavatory, luggage, and postal accommodation, and light luggage space is available beside the driver. A total of 31 of these cars has been allocated to the B.A.G.S. Railway (F.C. del Sud) and seven to the B.A.W. Railway (F.C. del Oeste). In type "B" there are 28 first class seats and a lavatory; the B.A.G.S. Railway is taking 21 of these railcars and the B.A.W. seven. Type "B1" seats 28 first class passengers and has a buffet; the two cars of this type are going to the B.A.G.S. In type "C" are 20 first class and 24 second class seats, and separate lavatories for each class; eight of these cars are allocated to the B.A.G.S. and six to the B.A.W. Finally, the 15 cars of type "D" have accommodation for parcels, light goods, and postal traffic only, the distributed load being up to 7 tons. Nine cars of this class are going to the B.A.G.S. Railway and six to the B.A.W. Railway.

All these types have standard bogies, underframes, body details, body framing sections, and power and transmission equipment, and they represent the first large-scale attempt of a British railcar maker to take advantage of standardisation while retaining the necessary flexibility or interior arrangement. Including the eight standard-gauge cars, the whole 107 railcars were built to the requirements of the Drewry Car Co. Ltd., and to the inspection of Messrs. Livesey & Henderson, the railway companies' consulting engineers, at the Preston works of the English Electric Co. Ltd.

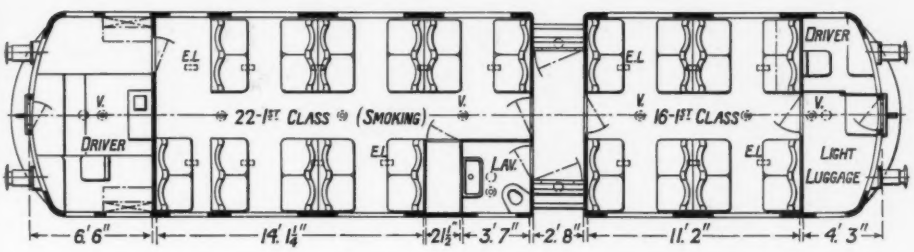
Framing and Body

The body framing and underframe are constructed as an integral unit from light rolled-steel sections, the underframe portion having channel section side and end members, well braced by transverse channel and plate members and reinforced where necessary by means of angle sections, knees, and gusset plates. The inner longitudinals are the main pair, and are formed of 9 in. by 3 in. channels, which are raised 5 in. at the driving end in order to clear the engine mounted on the bogie beneath. The outer solebars are of 6 in. by 3 in. by $\frac{5}{8}$ in. angle, but are broken at the location of the entrance and exit vestibule, in order to allow of access to the car from ground level; the inner longitudinals are continuous, and are connected to the solebars not only by the usual cross-bracing of angles and plates but also by stiffened

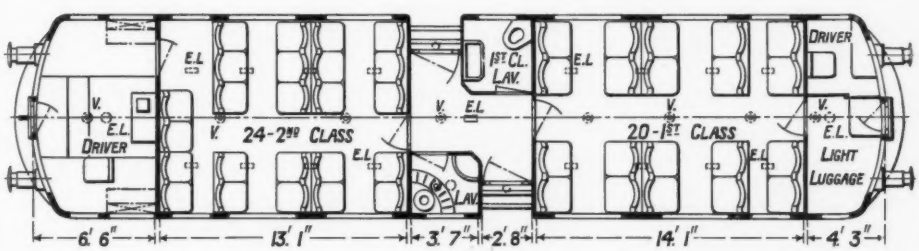




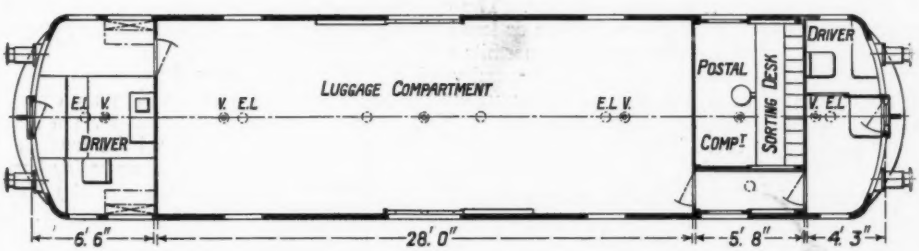
Railcar of type "A." 38 of these vehicles are being built



Railcar of type "B." 30 of these vehicles are on order, and also two buffet cars classed as B 1



Railcar of type "C." 14 of these first and second class composite vehicles are being built



The order of 99 cars is completed by 15 of these luggage and light goods cars, which are styled type "D"

structures of 7 in. by 3 in. channel at the bogie centres and by headstocks of 10 in. by 3 in. by 19 lb. channels and ¼ in. top and bottom plates. With the exception of the headstocks, which are riveted to the longitudinals, the whole underframe portion is welded up.

The body framing portion is made up principally in 16 s.w.g. pressed steel sections attached to the solebars through riveted gussets at the base of the pillars, together with cross-bars or stretchers, the whole forming a hoop structure combining lightness with maximum strength. The longitudinal members are securely attached to the pillars and welded in position, the whole being suitably braced and reinforced by gusset plates to preserve rigidity and prevent distortion due to acceleration and braking stresses.

Planished steel sheets of 18 s.w.g. have been used for the outside panelling, which as far as possible are flush-sided with a minimum of mouldings and, in general, are riveted to the framing. All the steel used in the construction of the body is of first quality c.r.c.a. suitable for

oxy-acetylene or electric arc welding, and guaranteed to conform to the following specification:—

Yield point..	25/28 tons per sq. in.
Ultimate yield	28/32 ,, ,, ,,
Elongation	10 per cent.

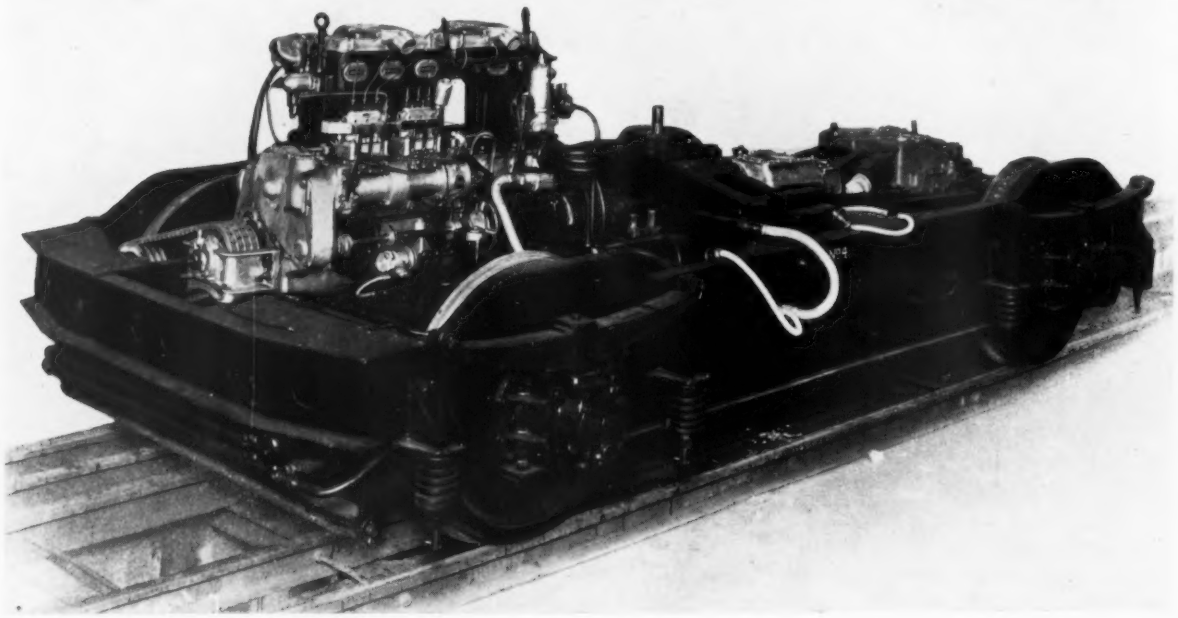
All framing prior to assembling and panelling was thoroughly coated with Bitumastic compound to prevent corrosion. Pressed steel members and sheet steel panels form the roof, and the rounded ends are formed from beaten metal panels. The ceiling inside is lined with plywood in the passenger compartments, and enamelled white or a soft green shade. The necessary degree of insulation has been afforded by the space between the outside panelling and inside finish, and the pillars and other framing members are drilled at intervals to ensure free circulation of air and so prevent sweating and corrosion.

Tongued and grooved red deal boards are used for the floor, and the necessary trap doors and openings are provided to afford access to bogie centres, brake gear, and transmission units. All such openings are properly fitted and edged with metallic beading. The floors for the passenger compartments are covered with Spencer-Moulton rubber carpet, and the sides of the floors are coved and rounded to facilitate washing out, drain plugs being provided where required. Luggage compartment floors are covered with hardwood wearing slats. The driver's compartment windows are arranged to open and are fitted with armour-plate glass. A full-drop window is situated next to the driver, and the front windows are of the fixed type. The side openings in the passenger compartments are fitted generally with half drop lights.

Entrance and exit doors of the passenger saloons are arranged as shown on the appropriate plans. All doors are of the hinged type and open inwards. The hinged internal communicating doors to the drivers' compartments are fitted with private locks. Passengers' entrances are provided with steps to enable access to be gained from both rail and platform levels.

Each driver's window is fitted with a steel sun visor and an automatic screen wiper. All lighting fixtures and fittings are of J. Stone & Company's railbus type to suit the class of vehicle, and passenger entrances are provided with lights to facilitate entry at night. Overhead luggage racks are provided in addition to the luggage space formed beneath the seats. The seats themselves are mainly of the double back-to-back type, although many are installed as single units; they are upholstered to suit the requirements of the various car layouts. In addition to the ventilation afforded by the side openings, the main roof is provided with a suitable number of Monarch extractor ventilators.

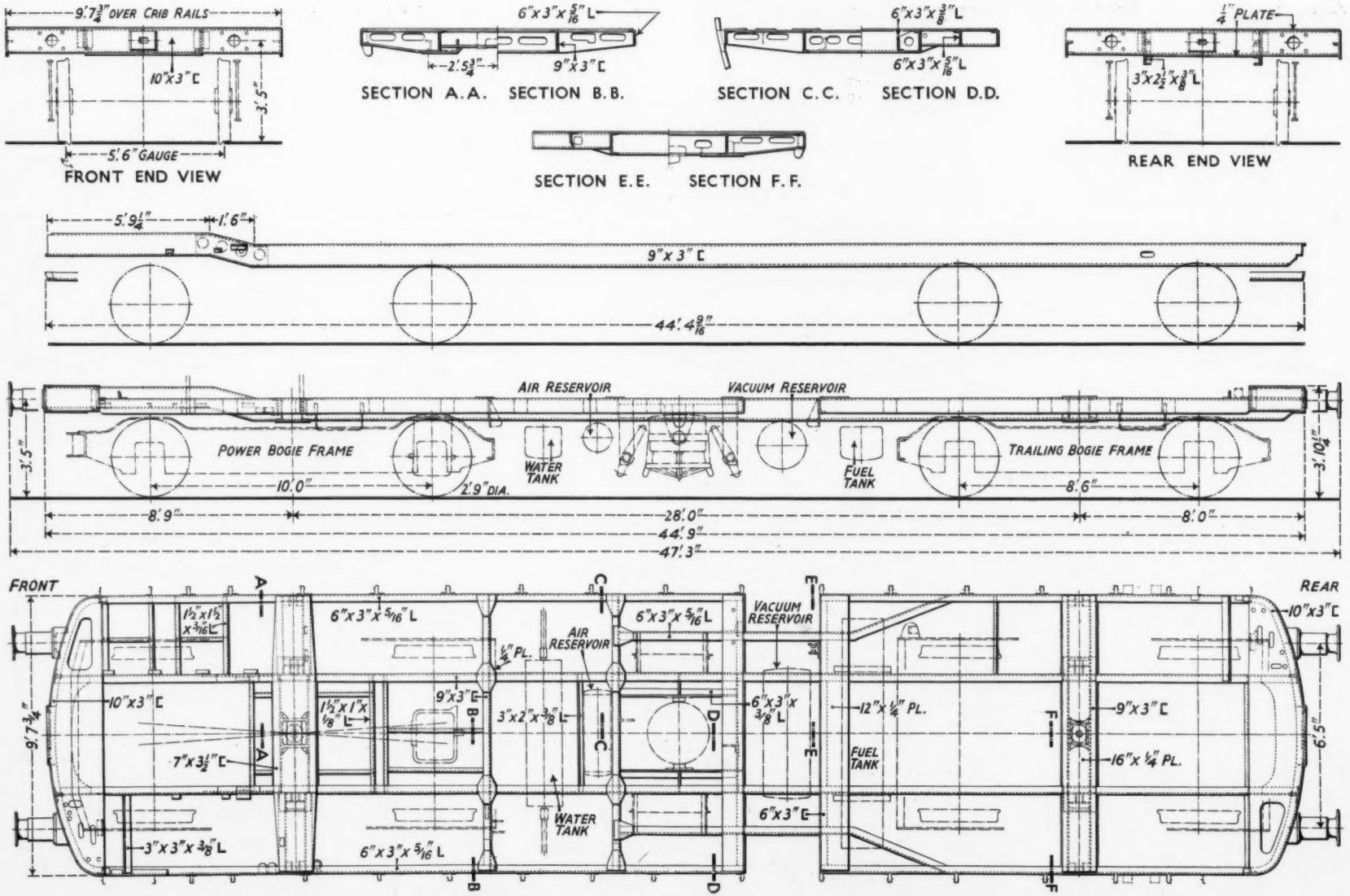
The heating system on these railcars comprises a Cochran Sinuflo exhaust-gas hot-water boiler mounted vertically in the casing above the engine and located side by side with the silencer. This boiler is 8 in. square inside and 3 ft. 6 in. long overall; it contains four 2 in. Sinuflo tubes 2 ft. 9¼ in. long. The exhaust gases are brought through a flexible connection to a Y-type hand-controlled by-pass valve with exits to the silencer and boiler. The output of the boiler is controlled by passing more or less of the exhaust through it. This arrangement also permits of the heat being shut off in summer without the necessity of emptying the water from the system. The pump for the heating system is of the Gwynne centrifugal type with a capacity of 12 gal. a minute when running at 2,500 r.p.m.; it is driven by vee belts from the front of the engine. The heating system is normally kept filled with water whether in or out of use, and the level is automatically maintained from the cooling system.



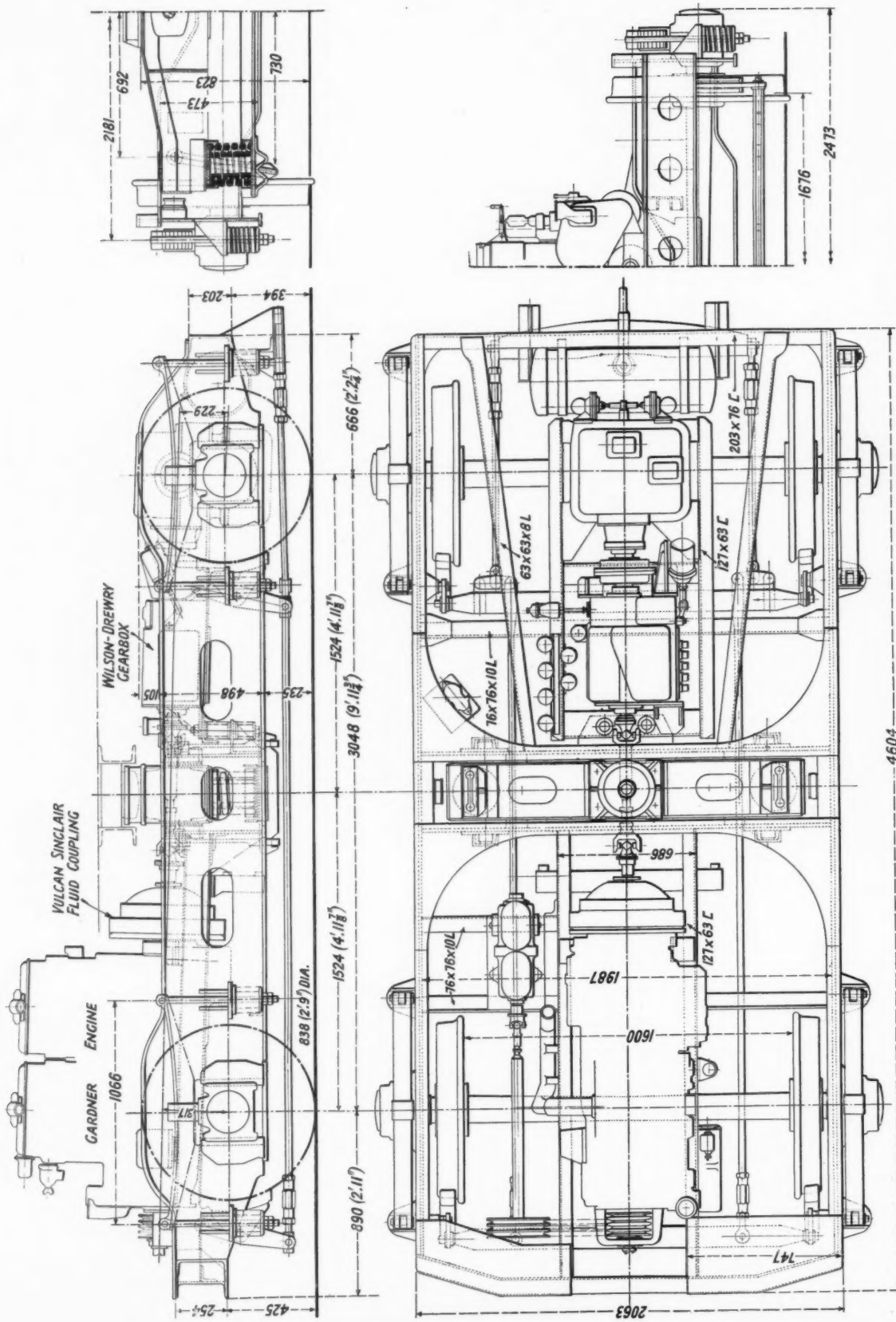
Broad-gauge power bogie with welded steel framework, and carrying engine, gearbox, transmission, and reverse gears

Bogies

All the bogies, whether of the power or trailing type, are of the swing-bolster type, and are fitted with Newlay type solid disc wheels of 2 ft. 9 in. diameter on tread. The power bogies are constructed of rolled steel plate side members, with channel-section end and cross members, the side plates being reinforced as required by angle sections. The whole structure is well stayed by transverse bracing members and reinforced as required by angles and gussets, accurately aligned and riveted or welded,



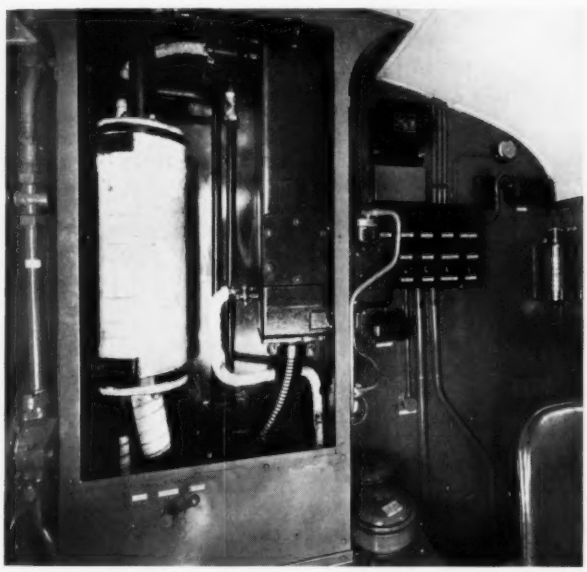
Welded steel underframe of the 99 Drewry cars for the broad-gauge lines of the Buenos Ayres Great Southern and Buenos Ayres Western Railways. Multiple-unit control is fitted, but the cars are not intended for trailer haulage



General arrangement of power bogie for 5 ft. 6 in. gauge railcars. The bogie carries a 102 b.h.p. Gardner engine, Vulcan-Sinclair fluid coupling, and Wilson-Drewry electro-pneumatically controlled four-speed gearbox

a combination of both methods being used in assembly. The trailing bogies are of the plate-framed type of similar though lighter construction than that of the power bogie, but the wheels, axleboxes, and other details are interchangeable between the two types.

Cast-steel centre pivots and side rubbing-blocks are fitted, together with all necessary check springs, all of which are interchangeable between all bogies. Cast-steel axleboxes fitted with Timken taper roller bearings are used throughout, and a total of 864 bearings has been required for the 99 broad-gauge cars and one spare power bogie, and the eight standard-gauge cars. The journal diameter is 4 in. Apart from the periodic examination of the oil level, it is not considered that the boxes will need attention for the first 200,000 miles. The axlebox guides are of cast steel with manganese steel liners. Laminated springs are used for the axle bearings, and have adjustable hangers fitted with auxiliary helical springs. Helical springs are used also for the swing bolsters of both power and trailing bogies. All the power bogies of the broad-gauge cars are interchangeable and



Engine room showing silencer, Cochran Sinuflo boiler, and certain details of the control gear

the design of the cars is such that a power bogie can be withdrawn from the end for major overhaul and a spare bogie substituted, all that is necessary being the jacking up of the coach and breaking various connections.

Vacuum automatic brakes with equipment of Westinghouse manufacture are fitted in addition to a hand screw brake operated from each driving compartment, and are designed to couple up with existing rolling stock. The vacuum cylinder is located beneath the underframe near the centre of the car, and through compensated brake rigging of the usual type applies one cast iron block on each wheel. The connection between the primary pull rods and the cross-beam on each bogie is through a roller, to prevent binding on curves. The cylinder has a detachable base and a stainless steel piston rod. Westinghouse equipment also extends to a combined single-acting compressor-exhauster set, which is a four-cylinder machine with the cylinders cast in two pairs; it is engine-driven. The exhauster portion caters for the brake requirements and the compressor portion for the electro-pneumatic engine and transmission controls. A dead-man emergency apparatus is incorporated.

Engine

The power bogie carries the entire engine and transmission system, and also the engine-driven auxiliaries. The engine is carried in a subframe of steel sections located forward of the bogie pivot, and balata packing strips are inserted between the engine and subframe to absorb the high-frequency vibrations. The engine used in all the cars is of the Gardner 6LW type, weighing, without dynamo or starting motor, about 1,450 lb. The six cylinders have a bore and stroke of 4·25 in. by 6·0 in. and develop a maximum output of 102 b.h.p. at 1,700 r.p.m., at which rating the brake m.e.p. is 93 lb. per sq. in. and the piston speed 1,700 ft. per min. The maximum torque is 340 lb. ft. at 1,100 r.p.m. Over the range of normal continuous outputs the fuel consumption is below 0·4 lb. per b.h.p.hr., and reaches its minimum of 0·37 lb. at 1,100 r.p.m., the speed for maximum torque. The cylinders are cast of iron in two blocks of three, and are bolted to a one-piece crankcase of aluminium alloy. Steel bridge plates stretch across the crankcase and carry the main bearings. The bottom of the crankcase is closed by a sump cast of Elektron and fitted with oil strainers. Hardened liners of the dry type are inserted in the cylinder barrels. The cylinder heads are cast of iron in blocks to correspond with the cylinder castings; they incorporate a chamber at the top in which are housed the valves, rockers, fuel sprayers, and decompression rods, and the whole lifts off as one assembly. A light-metal casing goes over the tops of the cylinder heads.

Light-alloy pistons carrying one scraper, one oil return and four compression rings are used; they have a deep concave depression in the crown. Attached to the pistons through fully-floating gudgeon pins are nickel steel connecting rods of I-section with a hole drilled down the centre for the pressure lubrication of the bronze-bushed small end. The big ends have detachable shells lined with white-metal. The nickel-alloy steel crankshaft is cut from a solid forging and machined all over; both shaft and pins are hollow-bored.

The camshaft is driven from the crankshaft by a triple-roller chain at the end remote from the flywheel and operates the valves through long push rods and rocker arms. The inlet and exhaust valves are opened against duplex helical springs and their location is arranged to produce a certain amount of turbulence. Gardner's own hand-operated decompression gear is arranged to lift the valves of each three-cylinder block, in order to provide easy starting by hand or electricity without the necessity of glow plugs.

Fuel injection is by two three-ram C.A.V.-Bosch pumps operated from a small camshaft driven by gears from the main camshaft. These pumps force the fuel at a pressure of about 2,500 lb. per sq. in. through the special Gardner fuel injectors, which comprise a spring-loaded hollow piston running in a cylinder and terminating in a needle valve resting on a conical seat. The valve is lifted from its seat during injection by the fluid pressure generated by the pump. There is an automatic timing gear to advance or retard the beginning of injection and it is operated from the governor to be in proportion to the speed. Oil for lubrication is forced through the system by a submerged gear-driven pump and is delivered to the main and big end bearings, the gudgeon pin, valve mechanism, and fuel pump cams and rollers.

The system is fitted with a special dual relief valve for working in conjunction with the external cooler for the oil. The main part of this relief valve is set to a pressure of 45 lb. per sq. in., and the second valve to

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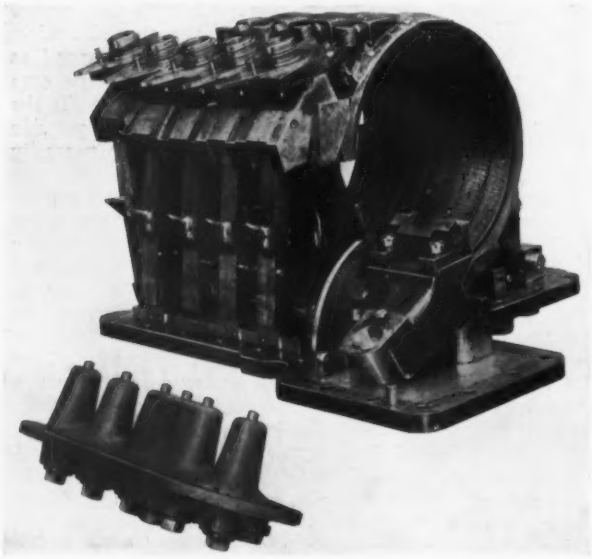
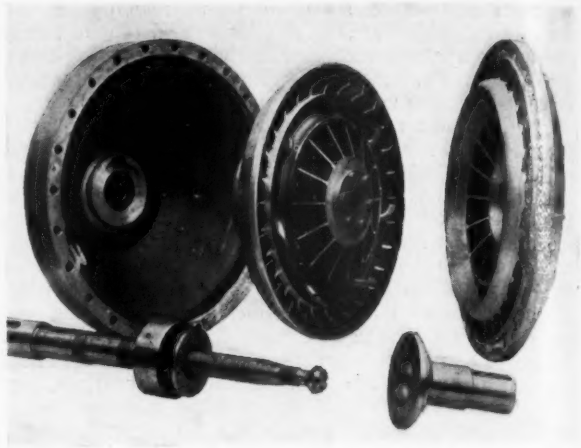
50 lb. Surplus oil from the first valve is circulated through the external oil cooler located on the bogie, but should there be any restriction in this cooler the second relief valve comes into action and allows the oil to pass directly to the governor and gears. A Tomey electrical switch is incorporated in the filter and relief valve assembly, on the delivery side of the filter. This relief valve is set to cut-in and so light a small red warning light on each instrument panel if the lubricating oil pressure should fall below 26 lb. per sq. in. The 6LW Gardner engine was described and illustrated in detail in the issue of this Supplement for March 19, 1937.

A triple-section gilled tube radiator made by the Spiral Tube & Components Co. Ltd., and mounted on the engine room roof, forms the main constituent of the engine cooling system. The hot water leaves the engine near No. 1 cylinder, adjacent to the thermostat, and is delivered to the roof cooler. A temperature gauge is located at the top of the air chute at the point where the hot water enters the radiator. After leaving the radiator, the water flows back to the engine-driven circulating pump, and thence again through the jackets. The system works on the closed circuit principle; normally it is kept full of water and the pump thus only has to overcome the pipe friction. When starting, the radiators are filled by means of a semi-rotary hand pump in the engine room, which draws its supply from the main 40-gal. water tank below the railcar underframe. A change-over cock enables the roof flushing tanks for the lavatory to be filled in the same manner as soon as the cooling system is filled. The radiator header tanks are of cast iron, and the top, or centre, headers are of increased size in order to carry an adequate reserve of water.

The engine is started by means of a 24-volt C.A.V.-Bosch axial pattern electric starting motor engaging with a toothed ring on the engine flywheel, and a starter push is mounted on each of the two control desks. The starting motor is fed from a Stone's MVA lead-acid battery having a capacity of 164 amp. hr. at the five-hour rate, which also caters for the lighting and other auxiliary loads. The engine speed control is carried out by means of a sensitive governor, which in turn is controlled by means of a hand-lever in each driving position. This lever is



Brake band assembly and side cover for air selection of Wilson-Drewry four-speed gearbox



Components of Vulcan-Sinclair fluid coupling

connected to a pneumatic valve which admits air to a piston-type cylinder containing a coil spring for the regulation of the piston travel, and coupled to the speed control lever of the governor.

Main fuel tanks are housed on the underframe and carry 80 gal. of fuel, sufficient for a normal radius of over 400 miles. Fuel feed to the engine is by means of Autovac vacuum tanks working off the vacuum brake system, and combined with a ½-gal. service tank attached to the air trunk in the driving compartment, whence fuel flows to the engine by gravity. A filler cap is provided on the service tank so that a supply of fuel can be put into the gravity system for starting, and so enable the necessary vacuum service to be available from the main reservoir and engine-driven exhauster. The main fuel tanks are of welded construction and are provided with large filling orifices, a dial-type depth gauge on each side, and suitable internal baffles to prevent fuel surging. The fillers have quick-action covers and a gauze strainer in the neck. Fuel strainers are provided in the main fuel line and on the engine. An efficient silencer is fitted, and the tail pipe is led away to roof level through an uptake formed in the body of the coach.

Transmission

The Vulcan-Sinclair traction type fluid coupling, the first constituent of the transmission, is embodied in the engine flywheel, and a short Hardy-Spicer transmission shaft passing through the bogie bolster conveys the drive thence to the Wilson-Drewry gearbox. The gearbox and reverse unit are situated aft of the bogie centre, and well clear of it to give ample accessibility. Both units are carried on a patented three-point suspension subframe. The reverse and final drive unit is carried on the single driving axle. Attached to brackets on the main casting are two channel frame members which run forward from the reverse unit and which are anchored to the bogie centre transom through a bracket with rubber and steel springs which take the torque reaction and provide the flexible three-point suspension. A Standage resilient coupling is fitted between the gearbox and reversing gears to provide a further degree of flexibility in the drive.

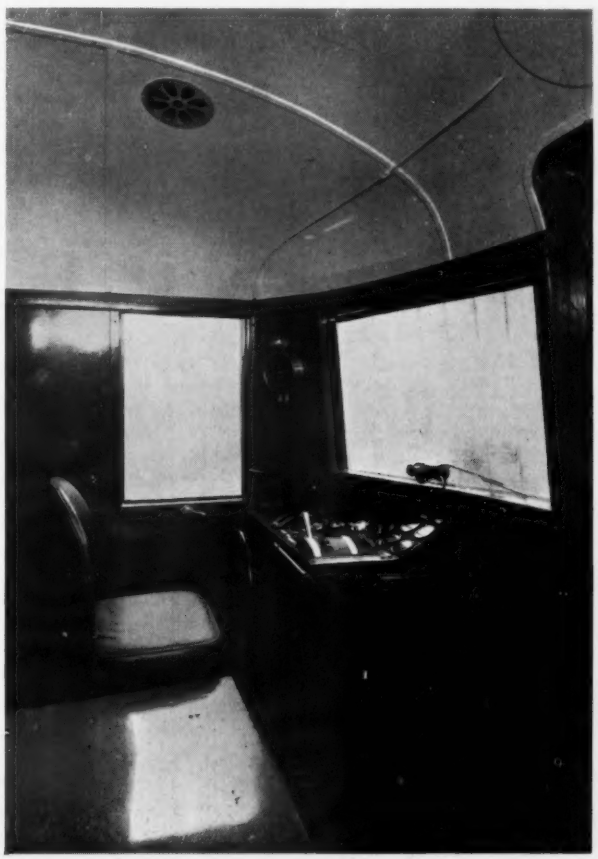
The function of the hydraulic coupling is to damp out torsional vibrations and to take up the drive smoothly when starting from rest or when changing gear, and thus relieve the epicyclic gearbox brake bands of wear from this source. The impeller, runner, and casing are all of high-tensile aluminium alloy. The coupling transmits the full 102 b.h.p. of the engine at 1,700 r.p.m. with a slip

of 3½ per cent. when filled with a thin mineral oil of low viscosity. The stalling speed of the coupling is just under 600 r.p.m., that is, when the engine speed at full load drops to this level the output shaft from the coupling will be held stationary and the fluid coupling will take up the full engine torque developed at this speed. The engine idles at 380-400 r.p.m., and at this speed only a relatively small amount of drag torque is transmitted through the coupling, enabling forward or reverse gears to be engaged with certainty.

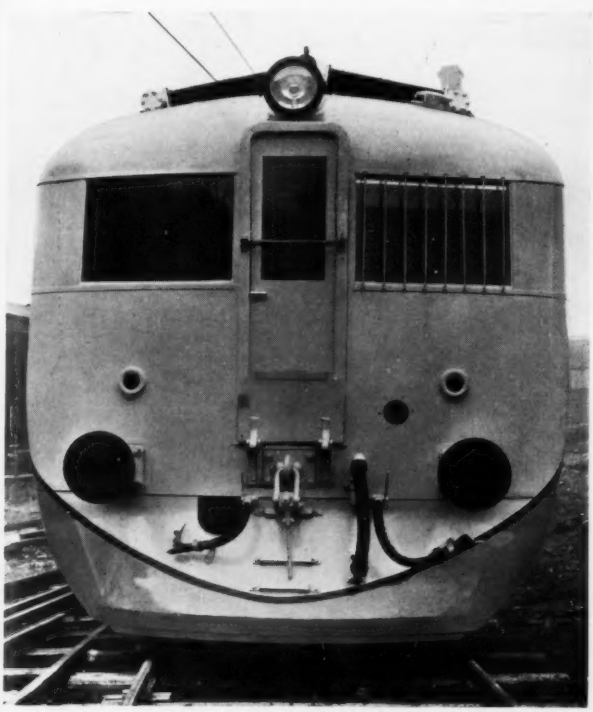
A four-speed preselective Wilson-Drewry epicyclic gearbox forms the main constituent of the transmission. Ball and roller bearings are used throughout the running gear of the box, which consists of four simple epicyclic trains inter-connected or compounded so that different gear combinations can be obtained. Lubrication is under pressure from a positive plunger pump contained in the box itself. The epicyclic brake bands are self-centring and completely encircle the drums. They work in oil, and adjustment of the bands for wear is automatically compensated within the box by means of coil spring ratchet adjusters. The gearbox is provided with pneumatic control for gear selection and gear engagement. The air is utilised only for effecting changes of speed, and the box does not depend upon air pressure for the retaining of the brake bands in engagement, this being obtained by means of a powerful coil spring. The gearbox has ratios of 4·15, 2·36, 1·56, and 1·0 to 1, and the final drive ratio is 3·39 to 1. With 1,700 r.p.m. engine speed and 3½ per cent. slip in the coupling, the corresponding track speeds with new wheels are 11½, 20, 30½, and 47½ m.p.h.

Gear selection is effected by means of five small air cylinders and electro-magnetic valves embodied in the gearbox side cover, one for each of the four gears and one for neutral. There is also one for the change-speed engagement or clutch external operating cylinder. These cylinders and valves control the struts, and gear engagement is effected by an air cylinder which operates the gearbox bus-bar. The selector and engagement cylinders are controlled by means of electro-pneumatic valves situated adjacent to the cylinders, the air connections being thus short in length, resulting in absence of time-lag, the control connections to the two control desks being simple electrical circuits. The air cylinder controlling the gear engagement is provided with a choke which restricts the exhausting air and so controls the rate of engagement by a pre-determined amount. Harsh manipulation of the control thus cannot result in damage to the gears.

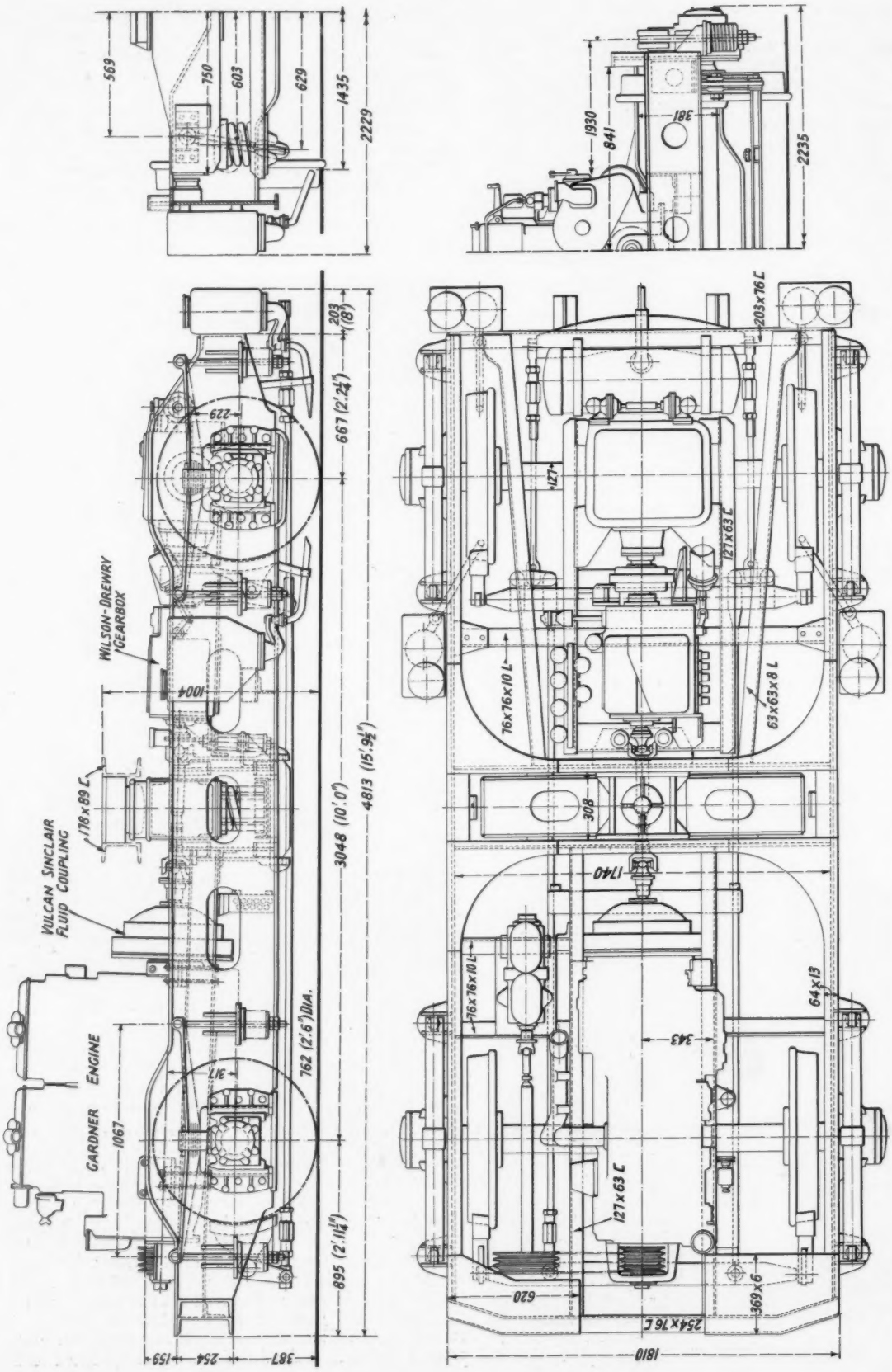
The reverse gear is mounted on the driving axle. The reverse box itself is a steel casting with light alloy top and bottom covers. The gears are of special case-hardened nickel-alloy steel mounted on nickel steel shafts running in ball or roller bearings. The reverse gears consist of a spiral-bevel pinion in mesh with two crown wheels of similar type, the latter running loose on the reverse shaft and being provided with internally-cut teeth. A reverse dog mounted on the splined centre portion of the reverse shaft engages with one or other of the two crown wheels as required; the actuation being by means of Westinghouse standard 5 in. diaphragm-type air cylinders mounted externally on the box; admission of air to one or other of these two cylinders is controlled by two electro-magnetic valves attached to the cylinders. A locking device is incorporated in the reverse to enable the latter to be positively located in the neutral or mid position should it be required to tow the coach. The reverse control is electro-pneumatically operated, and the reverse lever is embodied in the change-speed control



Driving compartment of diesel mechanical car



End view of broad-gauge car



General arrangement of standard-gauge Drewry power bogie with 100 b.h.p. engine and transmission as used in the cars of the Entre Rios and Argentine North Eastern Railways

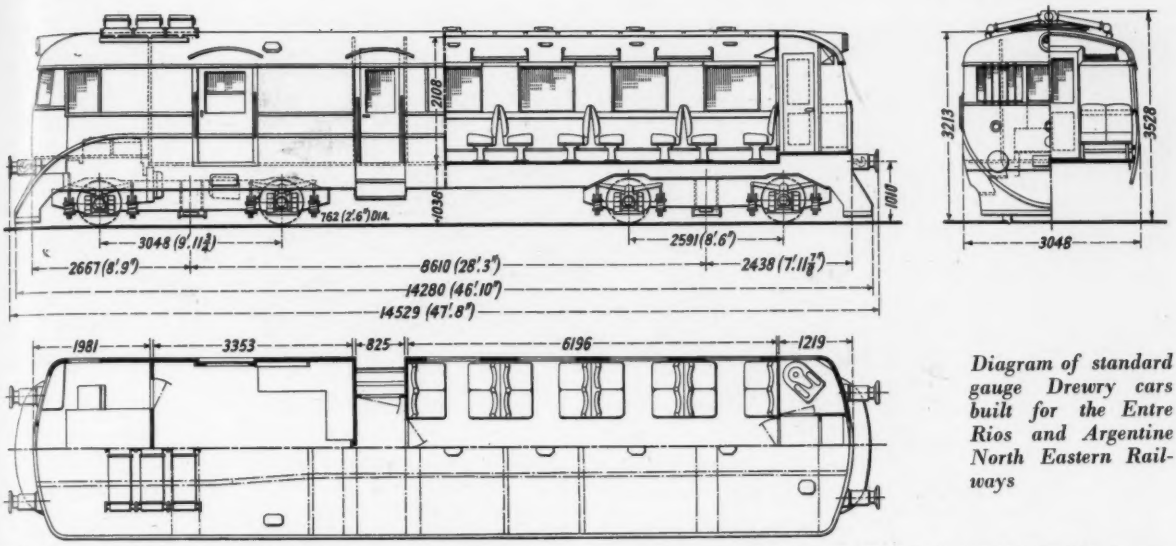


Diagram of standard gauge Drewry cars built for the Entre Rios and Argentine North Eastern Railways

quadrant. A simple form of interlock on the latter renders it impossible to actuate the forward-and-reverse control until the change-speed is in the neutral position. The final reduction gear to the axle is contained in the reverse and final drive casing and is of the helical-tooth spur wheel and pinion type. The centre line of the final shaft of the gearbox is 9 in. above the centre line of the axle, but in the plan view the drive is in a straight line from engine to axle.

Electrical Equipment and Controls

The engine drives a Stone's miniature Tonum dynamo of the 24-volt 1,200-watt type, which has a maximum capacity of 56 amp. at 28 volts, and is provided with a carbon-pile regulator and cut-in switch. A 12-cell 164 amp.hr. lightweight lead-acid Stone's battery is situated beneath the main underframe; it has a capacity sufficient for one hour's standby lighting in addition to normal starting and lighting services.

A Stone's swivelling-type 100-watt head lamp is mounted at each end of the coach, together with all necessary marker-lamps. Internal coach lighting is provided by a number of domed roof lights, these being grouped for partial illumination. All cables are carried in metal conduits or flexible metallic casings, and protected by suitable fuses. The main switch is situated in the driver's compartment at one end.

The controls are grouped on a control panel in front of each driving position, and each set of controls comprises a pneumatic engine speed governor control incorporating a dead-man feature; combined single-lever control for gear selection and gear engagement; forward and reverse control, all controls being operated electro-pneumatically; driver's vacuum brake valve; and hand screw brake. In addition to these there are the usual controls for the auxiliaries such as starter motor, master control switch, change-speed isolating switch, and foot control for headlamp beam diversion, situated in accessible positions on or adjacent to the control desks. Each driving position is furnished with a full set of instruments including speedometer, oil-pressure light, duplex vacuum gauge, single air gauge for control services,

Interior of second class compartment in one of the 100 b.h.p. diesel mechanical railcars for the broad-gauge lines of British-controlled railways in Argentina

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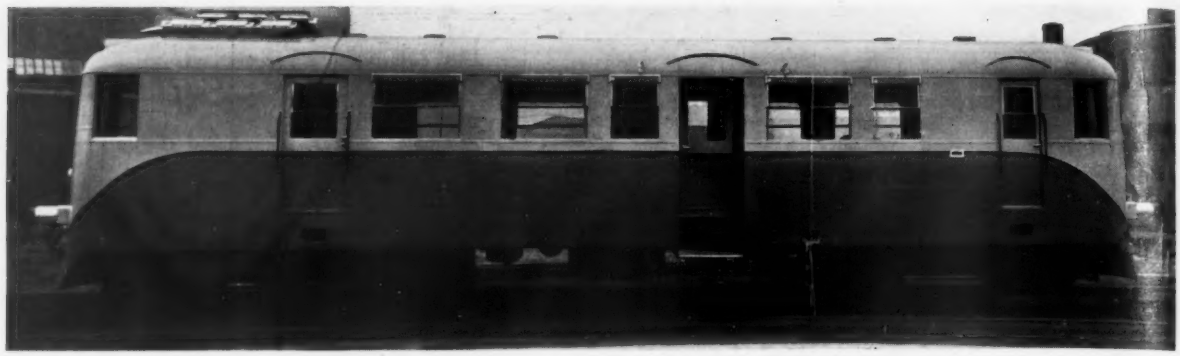
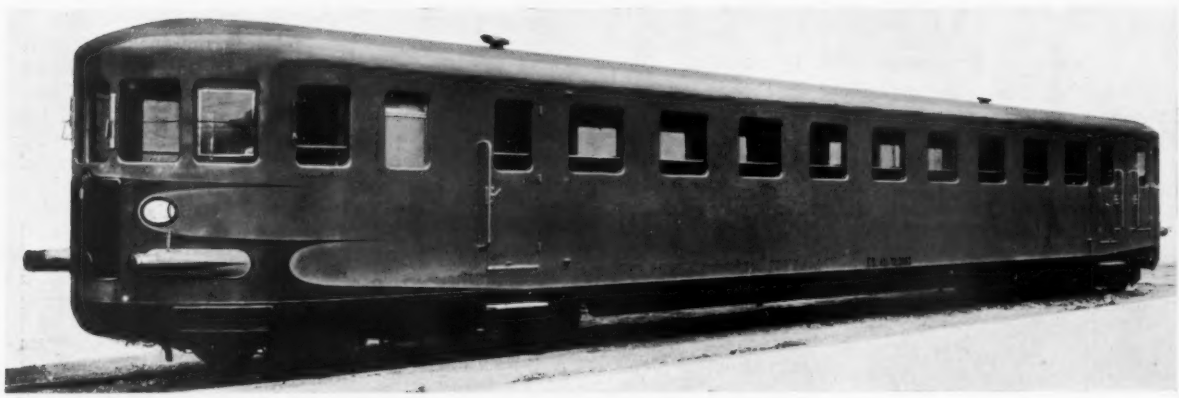


General view of one of the Argentine 100 b.h.p. Gardner-engined Drewry railcars

and revolution counters. Other equipment includes a Westinghouse Pneuphonic horn and electrically-driven C.A.V.-Bosch windscreen wipers.

All wiring conduits, pipework for braking and control services, and water circulation are painted in distinguishing colours to facilitate identification for maintenance. Water pipes are painted white, fuel pipes red, oil pipes blue, vacuum pipes green, air pipes yellow, and electric conduits black. Control pipework where of small diameter is carried out in specially annealed steel tubing to minimise scaling and facilitate reassembly after maintenance.

A New Type of Railcar in Italy



260 b.h.p. diesel-hydraulic railcar with top speed of 80 m.p.h., Italian State Railways

IN addition to the numerous Fiat and Breda diesel railcars at work or under construction, the Italian State Railways have taken delivery of three double-engined diesel-hydraulic all-metal railcars built by the Officine Meccaniche, of Milan. They have a length of 75 ft. and on a tare weight of 30 tons carry 72 seated passengers and have room for 16 standing. They are not intended for trailer haulage. Included in the car are lavatory, luggage, and mail accommodation. At each end of the vehicle is a power-transmission plant comprising a 130 b.h.p. Brescia-Saurer engine running at 1,600 r.p.m. and a Lysholm-Smith hydraulic torque converter which drives one axle of the bogie. Westinghouse brakes are incorporated.

DUTCH DIESEL LOCOMOTIVES.—Another 28 diesel-mechanical locomotives of 65 b.h.p. have been ordered by the State Mines of Holland for service underground. They are to have Kromhout-Gardner engines, Vulcan-Sinclair fluid couplings, and two-speed gearboxes.

BREDA ENGINES.—The A.E.C. type of engine, as built under licence by the Soc. Italiana Ernesto Breda, has been developed by the Italian firm into an eight-cylinder unit of greater output than the standard six-cylinder 130 b.h.p. model. It is understood also that a 12-cylinder vee engine is under consideration.

CONVERSIONS IN CUBA.—Sulzer Bros., of Winterthur, have completed three 270 b.h.p. six-cylinder oil engines for the United Railways of Havana & Regla Warehouses Ltd., and these are to replace petrol engines in existing railcars. As main contractors, Sulzer also supplied electric control equipment.

IRISH RAILCAR MILEAGE.—The Great Northern Railway of Ireland now has experience with diesel-mechanical railcars and pneumatic-tyred railbuses amounting to about 900,000 miles on local, branch line, and suburban services.

MORE ARTICULATED TRAINS FOR IRELAND

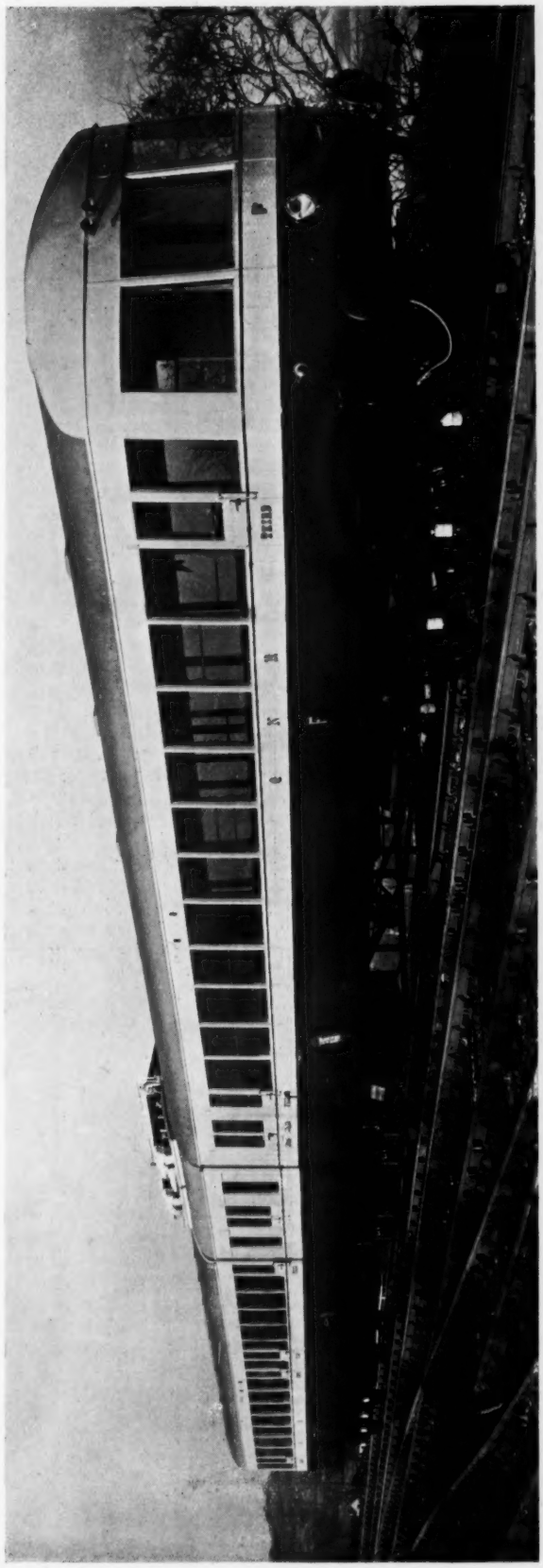
41-ton 200 b.h.p. units with 164 seats to operate on broad-gauge suburban services

ANOTHER forward development in the application of diesel units to intensive short distance passenger services has been made by the Great Northern Railway of Ireland under the direction of Mr. G. B. Howden, the Chief Engineer, with the introduction of two new triple-unit trains on the Dublin—Howth line. These trains, *F* and *G* in the railway company's diesel list, have an installed engine capacity of 200 b.h.p., and are replacing the earlier 150 b.h.p. triple units, D and E, which are being transferred to the Belfast area. In both types the short centre vehicle is a power carriage only, but in *D* and *E* sets there was one engine only and the final drive to the six wheels was through coupling rods, whereas in *F* and *G* rakes the centre unit has four wheels, and the two axles are driven independently.

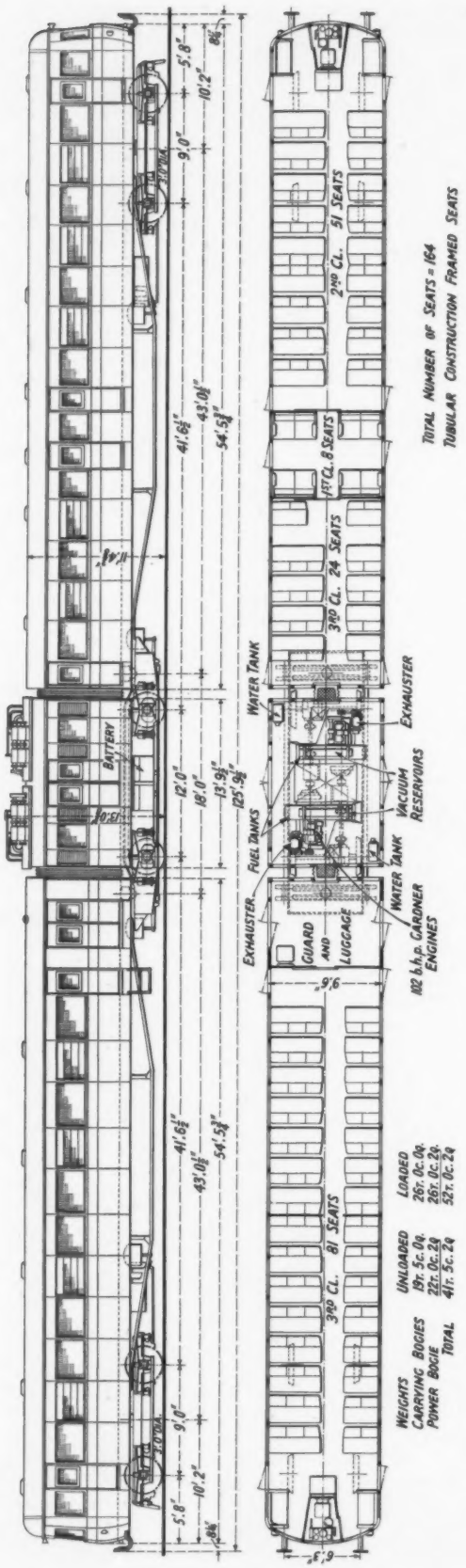
A new form of power bogie construction has been evolved and patented by Walker Bros. (Wigan) Ltd., and its first application is to these two G.N.R.(I.) units. It is not, strictly speaking, a bogie, but a four-wheeled rigid frame unit of riveted construction with a pivot socket at each end, and in these sockets turn the pivots of the inner ends of the two passenger carrying portions. These hemispherical pivots, of steel running on steel, are carried on double transverse laminated springs surrounded by a cast steel frame stretcher; normally, they carry the body weight, and the spring-loaded side bearers come into action only to damp out oscillations. The inner ends of the coach portions thus have a springing system additional to the normal suspension system of the power vehicle. Moreover, transverse movements are cushioned and partly damped out by means of rubber blocks inserted in the pivot assembly. The carrying bogies at the outer ends of the train are of the light type standardised by the Great Northern Railway for its railcars, and in conjunction with the new type of power chassis they have given a rake which rides extraordinarily well at all speeds up to the maximum of 48-50 m.p.h. These riding qualities are particularly noticeable on entering a curve, for there does not seem to be the slightest tendency for the initial oscillations to become cumulative and they are quickly damped down without uncomfortable motion being felt at any part of the train.

Power and Transmission

On the centre vehicle are mounted two completely independent power-transmission plants, each comprising a 6LW Gardner engine of 100 b.h.p., a Vulcan-Sinclair fluid coupling, a Wilson five-speed epicyclic gearbox, and the usual auxiliaries. The independence of the power plants extends right down the scale, each engine having its own exhauster set, cooler, and carriage heating and lighting systems. Thus, should one engine fail, the train can always be worked home at a fair speed, although one of the cars might be without lighting or heating. The Vulcan-Sinclair fluid coupling is incorporated in the engine flywheel housing, and the drive is taken thence through a Wellman-Bibby flexible coupling to the Wilson gearbox and then by a Layrub cardan shaft, made by the Laycock Engineering Co. Ltd., to the Walker final drive and reverse box on the axle. The engines are equipped with two three-ram C.A.V.-Bosch fuel pumps, Simms starting motor, dynamo and electrical equipment, and



Triple-unit twin-engined train with Walker power unit as introduced on the Dublin-Howth suburban service



General layout of the 200 b.h.p. diesel-mechanical train on the 5 ft. 3 in. gauge lines of the Great Northern Railway of Ireland. It is used for solo working and has three classes of accommodation

Visco air filters. Above each engine is mounted a 35-gal. cylindrical fuel tank (giving a direct gravity feed) and above this again is a vacuum reservoir for use in the engine throttle servo control system. A Vacuum Brake Company's exhauster for brakes and control is belt-driven by each engine at a speed somewhat lower than the engine crankshaft speed, and is fitted with a Burgess air cleaner. On the roof is carried a twin gilled tube radiator made by the Spiral Tube & Components Co. Ltd.; all the elements are devoted to water cooling, the engine lubricating oil being cooled in an internal cooler. The cooling system is controlled by thermostat and normally the water is not circulated through the roof radiator until a temperature of about 140 deg. F. has been reached. The car heating pipes are taken off the cooling system below the thermostat, so that there can always be a flow through them. Each engine has its own silencer lagged with asbestos. Between the silencers and the roof is an insulating lining of Kimoloboard within an aluminium casing.

Each engine-gearbox combination is carried on a subframe isolated from the main frame structure through balata pads. The engine accelerators are mechanically controlled by rods and Bowdenex cables from each of the two driving positions, but the engines can be stopped and started only from local control panels in the power house. The driver's throttle lever has incorporated in it a deadman trigger arrangement which, in operation, brings the engines down to idling speed and applies the vacuum brake. A warning light is fitted on the driver's control panel to indicate a failure in lubricating oil pressure in either of the two engines.

The Wilson preselective epicyclic gearbox is housed in an aluminium casing and with the top engine speed of 1,700 r.p.m. and a fluid coupling slip of 3½ per cent., gives track speeds of 12, 15, 24½, 34½, and 48 m.p.h. The Walker spiral bevel reverse gears and final drive spur gears are housed in a steel casting with external ribs on the bottom face, and are lubricated by a simple but efficacious oil bath-splash arrangement. Timken taper-roller bearings are used for the axle and Hoffmann bearings on the remainder of the reverse gear and final drive shafts. The torque rods are taken from the reverse box and are attached to the frames with the intermediary of rubber pads. The gear changing and reversing mechanisms are operated on a vacuum servo principle, and gear-changing can be carried out with 17 in. or more of vacuum. The gear selecting and speed-change levers are incorporated in a small notched panel immediately in front of the driver, and this embodies a neutral notch in which there is no connection between the transmission and the axle. In these trains it is not possible to reverse in the strictest sense of the word, in that to change the direction of motion the driver must go from one end of the train to the other, so that he can drive only in the direction corresponding to the particular driving cabin he is in.

Mechanical Portion

Timber body framing construction with outer panel plates of 20 s.w.g. steel is used in the passenger coaches and the design and construction of the bodies, underframes, and carrying bogies are simply developments of the *D* and *E* trains described in the issue of this Supplement for June 12, 1936. The exterior is finished in blue below the waist rail and cream above. The roof is of wood, covered with canvas and painted grey. For the finish of the interiors, brown and stippled cream Rexine has been used for the sides and roof respectively, and a pleasing effect has been obtained by graduating the colour from darkest on the lower side panels to lightest in the centre of the ceiling. The seats are carried on stove-enamelled steel tube frames supplied by Metal Utilities

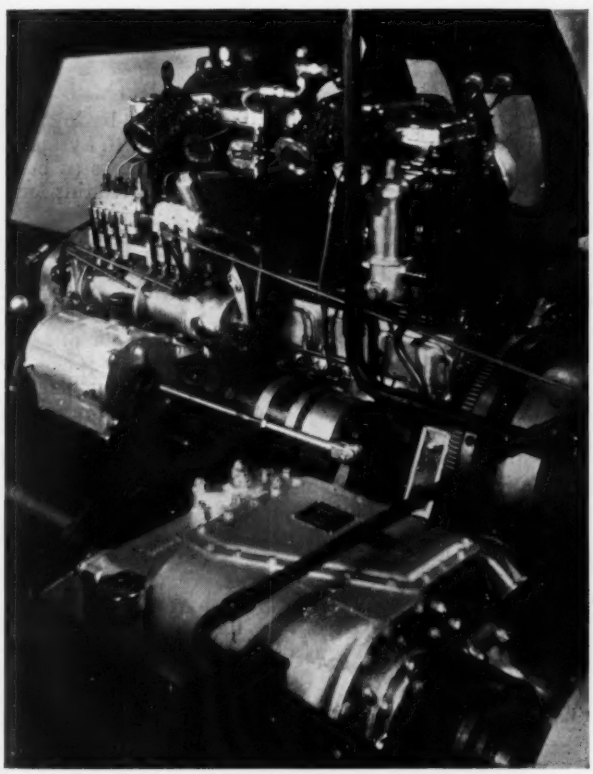
Limited, Dublin, and Dunlopillo cushions are used in all three classes. The parcels racks are of wood carried on aluminium brackets cast at the railway's Dundalk works, where the whole mechanical portions of the trains were built. Both fixed and moveable windows are embodied, and the latter are of Young's half-drop pattern. Burlingham hot water heaters are used. The lighting is electric, and each coach has its own complete circuit worked off half of the battery, as is the engine starting equipment. There are folding footsteps below each side door, and these can be pulled down by the guard when required for exit or entrance to or from rail level. A lamp in the driving position indicates if these steps are not properly in the folded up position. The doors have chromium-plated brass handles and drop lights. The saloon floors are of wood, covered with cork felt and overlaid with battleship linoleum; down the centre aisle is a hair-cord carpet. Warning is given by Lucas Melotone horns with buttons in each driving dashboard.

The Exide battery is mounted on the power unit frame in two 24-volt portions, each with a capacity of 74 amp. hr. The cells are carried in steel boxes, and they can be examined by letting down on hinges the top portion of the side cover; withdrawal of the cells requires only the unhinging of this cover and the loosening of three bolts.

Bogies and Brakes

The bogies are of riveted steel construction with wheels of a combined spoke and disc pattern; all the axleboxes are of the Hoffmann roller bearing type supported by overhung laminated springs with helical auxiliaries. The axlebox guides have wearing strips of manganese steel. A handbrake in each driving compartment applies the blocks on the wheels of the power chassis, but the vacuum brake applies blocks on all the wheels of the train, through a 15-in. cylinder for each carrying bogie and two 15-in. cylinders for the power vehicle. A quick release feature has been incorporated, so that when stopping at a station on a slight up-grade, the brakes can be kept on until the instant of moving off, and also to enable the driver to put on his brake at a terminal, walk to the other end of the train, and release it from the second driving cabin. In the previous trains this was not possible, and as the driver had to release his brake before changing ends, there was a chance of the train moving slowly off as he walked down the length, as all the terminal stations are not on dead level track. The quick release feature has been obtained by providing close to the driver's brake valve an additional release chamber carrying 27 in. of vacuum as against the normal 21 in. in the train pipe, and having a special feed-valve between the chamber and the driver's valve. As in the carrying bogies there are no brake hangers, the cross-rods operating directly on the blocks, the brake reaction is taken on the bogie headstock, and to cater for this thrust there is a strong central member running from the headstock to the centre transom.

In stopping service with the stations close together the fuel consumption of the train is about 5 m.p.g., and on turns with longer distances between stops about 7 m.p.g. Normal service accelerations, as distinct from the maxima possible, are from rest to 10 m.p.h. in 10-11 sec.; to 15 m.p.h. in 20 sec.; to 20 m.p.h. in 33 to 40 sec.; and to 30 m.p.h. in 60 to 70 sec. In normal stops the braking brings the train to rest from 40 m.p.h. in 23 to 26 sec., or from 30 m.p.h. to rest in 18 to 20 sec. The location of the power and transmission equipment on a separate structure has kept away noise, smell, and vibration from the passenger carrying portions, and this is assisted by the double doors between the engine room and the saloons. It is true that some noise may be heard and vibration felt in the seats nearest to the engine rooms, but in the second class saloon at one extremity of the train the isolation efficiency is remarkable, and gives the impression that the train is coasting all the time.



Gardner engine and five-speed Wilson gearbox installed in the new diesel train of the Great Northern Railway of Ireland

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PRODUCER-GAS CARS IN ITALY.—Three producer-gas railcars are being built for the Italian State Railways by the S.A. Ansaldo. They are to be about 72 ft. long and will have accommodation for about 70 passengers plus luggage and mails.

CEYLON DIESELS.—The first of the diesel-electric trains of the Ceylon Government Railways has gone into service. On March 4 it was ceremonially named *Silver Foam* by the Ceylon Minister of Communications. The second train is named *Silver Spray* and the third *Silver Mist*.

CHANGING DRIVERS.—The South East division of the French National Railways (ex-P.L.M. Railway) is now changing drivers on long railcar runs at convenient points. For example, on the Lyons-Strasbourg run, a driver from Venissieux depot takes the car to Besançon, and there hands over to a driver from that shed. On the Alpine line a Grenoble driver is in charge from that town to Veynes, and a Marseilles driver there takes over for the remainder of the journey to Marseilles.

HIGH-POWER CARS IN FRANCE.—Of the ten standard cars with two 300 b.h.p. engines ordered last year by the P.O.-Midi Railway, two are now in service and are attached to Narbonne depot; the other eight are to go into traffic there in time for the summer services. The Western (ex-Etat) section of the National Railways is now carrying out preliminary trials with five Renault single-engined cars of 500 b.h.p.

NOTES AND NEWS

Fluid Couplings.—There are now well over 850 Vulcan-Sinclair fluid couplings at work in rail traction and they transmit in the aggregate about 125,000 h.p.

German Diesel Extension.—Proposals have been made to run a fast diesel service on the Reichsbahn all the way from Berlin to Basle, on the Swiss frontier. The distance is about 550 miles.

Locomotives for Africa.—Fiat is building two narrow-gauge diesel locomotives for Eritrea. Each will be powered by a 12-cylinder vee Fiat engine whose output at sea level will be raised from the normal 450 b.h.p. to 600 b.h.p. by a Büchi supercharger.

Central Argentine Trains.—The first of the dozen twin-articulated Ganz diesel trains for the Central Argentine Railway (see issue of this Supplement for November 26, 1937) arrived in Buenos Aires last month. They were shipped from Bremen.

Railcars for Egypt.—Two single-engined 240 b.h.p. diesel-mechanical railcars are being built by Ganz for the Egyptian State Railways to cater for the luggage, parcels, and light goods traffic on the Cairo-Helwan line, the complete passenger traffic on which is now operated by the Ganz 480 b.h.p. twin-car diesel sets.

Fluid Coupling Patents.—The grant of British letters patent on application No. 464,225 in the name of D. Sensaud de Lavaud for improvements in power transmission devices has been refused by a decision of the Comptroller General of Patents dated January 24, 1938, as the result of opposition entered by Fluid Flywheels Limited.

Swiss Railcars.—The Swiss Federal Railways are placing an order for two diesel-electric railcars, having a maximum speed of 100 km.p.h. (62 m.p.h.), for service on lines at present steam-operated. One of the cars is to be shown at the Swiss National Exhibition at Zurich in 1939.

American Orders.—The Reading Railroad has placed orders with the American Locomotive Company for two 900 b.h.p. diesel-electric switching locomotives, and for six 600 b.h.p. diesel-electric switching locomotives with the Electro-Motive Corporation. The cost of each of these new units will be approximately $60,000 (£12,000).

Hunslet Locomotive.—The illustration on this page shows a Hunslet diesel-mechanical locomotive at work on a freight train on a narrow-gauge line on the Gold Coast. This locomotive is powered by a 135 b.h.p. M.A.N. engine and has the Hunslet patent mechanical transmission, and actually it forms a repeat order of previous units.

Timken Boxes.—During 1937 British Timken taper roller bearing axleboxes were applied to, or ordered for, over 200 diesel railcars and trains, and a large number of these vehicles also are being equipped with Timken bearings for the final drives of the transmission. Timken boxes also were applied to various diesel vehicles in France and the U.S.A.

American Two-Stroke Engine.—The General Motors Corporation is now building on mass production lines at its new Detroit plant, a range of light-weight two-stroke engines varying in size from 15 to 400 b.h.p. The rotational speeds are from 1,200 to 2,000 r.p.m., and the number of cylinders varies from one to eight. It is understood that these engines are fitted with superchargers.

Indian Railcars.—Ganz & Co., of Budapest, has received an order from the North Western Railway of India for 11 broad gauge railcars and two spare power bogies. Each car will have a six-cylinder engine set to give 240 b.h.p. and a five-speed gearbox. The contract price is Rs.12,68,520 (£95,000) for the railcars, Rs.1,10,300 (£8,500) for the spare bogies, and Rs.40,807 (£3,000) for certain other spare parts.

Swiss Supercharged Railcar.—The 420 b.h.p. baggage railcar with Sulzer engine set to work on the Swiss Federal Railways in 1929 was rebuilt some time ago with a Büchi exhaust gas supercharger which has raised the output to 600 b.h.p. at the same rotational speed of 750 r.p.m. The car is now working on the Winterthur-Schaffhausen-Singen, Schaffhausen-Basle and Basle-Winterthur lines, and hauls a number of passenger carriages.

Lysholm-Smith Hydraulic Transmission.—A licence for this system of transmission is now held by the Kobe Steel Works Limited, Japan, and in a brochure issued by that firm and sent to us by the Aktiebolaget Ljungströms, Ångturbin, are illustrated double-bogie diesel railcars of the Japanese State Railways fitted with Lysholm-Smith drive. The Nohab petrol-engined railcars as built for Swedish lines by Nydquist & Holm also have this form of transmission.

Fuel Pump Control.—The Saurer company, of Arbon, Switzerland, has taken out a British patent for a servo-motor type of timing control for fuel injection pumps, one of the chief features of which is that only a small governor without complicated linkage is required. The patent number is 467808. The Robt. Bosch A.G. also has taken out a patent (No. 468615) for a pneumatic governor for fuel pumps, in order to provide a means of damping out the fluctuations of pressure which occur when the engine is running so slowly that the individual suction strokes can be felt by the governor, thus causing oscillation of the control element.

American Diesel Programme.—Seven diesel-hauled trains have been ordered by the Atchison, Topeka & Santa Fé Railroad for delivery during the coming summer, and all of the locomotives will be built by the Electro-Motive Corporation. They will be powered by Winton two-stroke engines. Some of these trains will operate between Chicago and Kansas City and others, such as El Capitan, between Chicago and California. El Capitan itself is to consist of a five-car stainless steel train with accommodation for 192 passengers and will be hauled by an 1,800 b.h.p. diesel-electric locomotive; two trains will run the service, which will operate on the 39¾-hr. service of the diesel-hauled Super-Chief (see issue of this Supplement for August 6, 1937).